DEVELOPMENT OF A SIMULATION GAME "NEGOTIATION" AND ANALYSIS OF STUDENT REACTION TO THE GAME ACCORDING TO FACTORS OF MEASURED INTELLECTUAL QUOTIENT, SEX AND GRADE LEVEL

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DEVELOPMENT OF A SIMULATION GAME " NEGOTIATION " AND ANALYSIS OF STUDENT REACTION TO THE GAME ACCORDING TO FACTORS OF MEASURED INTELLECTUAL QUOTIENT, SEX AND GRADE LEVEL

An Internship Report

Presented to the

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In Partial Fulfillment

of the Requirements for the Degree

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by

Albert Clarence Hodder

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SCHOOL OF GRADUATE STUDIES

The undersigned cerifies that he has read and recommends to the School of Graduate Studies for the acceptance, an internship report entitled "DEVELOPMENT of a SIMULATION GAME 'NEGOTIATION' and ANALYSIS of STUDENT REACTION to the GAME ACCORDING to FACTORS of MEASURED INTELLECTUAL QUOTIENT, SEX and GRADE LEVEL," submitted by Albert C. Hodder in partial fulfillment of the requirements for the degree of Master of Education.

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ABSTRACT

This study was concerned with the evaluation of a researcher's developed simulation game "Negotiation". Furthermore, the study analysed the reactions of grade nine and ten students to the developed simulation game according to sex, intellectual quotient and grade level. A questionnaire consisting of sixteen multiple-choice and four open-ended questions was developed. The questionnaire assessed a wide range of reactions of students to simulation games such as liking of simulation games, perception of role playing, involvement in role playing, and choice of learning method. A second instrument, the Otis-Lennon test assessed the intellectual quotients of students involved in the study.

The following five descriptive hypotheses were tested in the study:

1. Is there a difference between the reactions of grade nine high school students to the simulation game "Negotiation" according to sex differences?

2. Is there a difference between the reactions of grade nine high school students to the simulation game "Negotiation" according to intellectual quotient?

3. Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to sex differences?

4. Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to intellectual quotient?

5. Is there a difference between the reactions of high school students to the simulation game "Negotiation" according to grade level?

Students' responses were investigated using Chi Square and Fisher Exact test analysis. The results indicated that simulations games can make students aware of specific concepts as well as other teaching methods. Analysis of the sample groups' responses appeared to indicate that the contents of "Negotiation" were interesting and highly involved the majority of students in role playing. Furthermore, the study suggested that simulation games could be used more often in the classroom. Finally, the results suggested that if students had a choice of learning a concept, a simulation game probably would be selected more often than a film or study in the library.

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CHAPTER I

INTRODUCTION

Evidence indicates that games have been an important component in the life of mankind for four thousand years and this influence has continued until the present. Aveden (1971) reported findings of historians and archeaologists who found game boards and dice games dated as early as 2600 B.C. Furthermore, the influence of games since the Greek and Roman cililizations can be traced by studying not only the artifacts but also the legislation governing gambling. For example, antigambling laws in Rome more than two thousand years ago indicates the influences of the gambling game.

In our modern day psychologists and educators, (Piaget, 1932, 1951 and Sutton-Smith, 1971) have specified the importance of play experiences on the emotional and intellectual development of children. Coleman (1971) wrote "Playing games is a very old and widespread form of learning" (p. 332). However, it appears that only recently have educators begun to explore the influence of these experiences on the learning process (Sharan, 1976). Harpole (1975) interestingly pointed out that formal learning in schools is, to a large extent, the trying out of certain roles and the imaginative extension of the self into experimental environments. Furthermore, Harpole (1975) wrote "it appears that simulation and gaming strategies in education may contribute valuably to the 'trying out process' ". Since this report will

be assessing simulation games, a clear definition as to what is meant by the term would be invaluable.

Sharan (1976) wrote the following definition:

> "a simulation is anything which models reality. and can include such widely differing phenomena as mathematical formulae, role playing, films, or sculpture." (p. 188)

Gibbs (1974) stated "a simulation is a dynamic representation which employs substitute elements to replace real or hypothetical components". A simulation is different form a game. Shirts (1972) defined a game as "an activity in which people agree to abide by a set of conditions in order to achieve a desirable state or end". Gibbs (1974) wrote "a game is an activity carried out by cooperating or competing decision-makers seeking to achieve, within roles, their objectives". Furthermore a simulation is different from a contest or role playing. The main issue in a contest is competition. For example, a municipal or any other election is a contest, but is not a simulation. Role playing requires a person to assume an identity other than his own to increase his understanding of another person (Garvey, 1971). Role playing is a structural extention of play. It appears then that each activity can exist independently of the other. They can also be combined with each other in different ways. It is sufficient to say that the activities referred to as a simulation game may be a combination of all three categories and may be defined

as simulation-games/role-playing contests (Sharan, 1976). Simulation games model the real world but are less complex because a game cannot be as complex as the reality on which it is based. However, according to Maidment and Bronstein (1973) the more complex a simulation is, the more it mirrors reality. Furthermore, the more salient aspects of the situation must be included in the model so that the simulation will come close enough to the actual situation and give some sense of real involvement (Sharan, 1976; Abt, 1968, 1971; Boocock and Schild, 1968; Inbar and Stoll, 1973).

In general the rationale for using games is to create an atmosphere in the classroom in which students at various levels of ability can work together to acquire communication skills, develop desirable attitudes, and instill correct practices (Wagner, 1964).

This chapter will examine some of the literature and research studies concerning simulation games and their use in the classroom.

REVIEW OF THE RELATED LITERATURE

The simulation game technique

It was during the 1960's that the potential learning value of simulation and gaming became recognized by teachers of elementary and secondary school students. Simulation games make use of probably the oldest educational technique known to man - learn by doing. They usually require small groups, although a large number of participants can be involved, to explore social processes and skills through human interaction and problem-solving (Sharan, 1976). By using a simulation game the student is permitted to experiment without being hurt by his faulty decisions. It is similar to a General being involved in a war game exercise, his army may be decimated but no lives are lost and the General may learn a strategic lesson which may be significant in actual combat.

Some qualities of simulation games

Several qualities of simulation games suggest they can be effective teaching and training devices for students of all ages (Abt, 1970). Creators of simulation games maintain that simulation games are enjoyable and highly motivating. Research studies indicate similar conclusions. Nesbitt, (1971) stated:

> "Most of the evidence gained from students involving educational games strongly indicates that youngsters do at least enjoy playing them - surely more than learning from routine methods" (p. 55).

After researching several simulation games Raiser (1971) wrote "there is one conclusion that does emerge about simulation games, there is almost universal enthusiasm for them".

The motivational aspect of simulation games is very apparent

and is borne out by descriptive studies conducted by(Tansey, 1971 and Abt, 1970). Tansey (1971) indicated that during the conduct of one experiment, the high school students who were involved in the simulation game became so intensely interested in research needed to enable them to function more effectively, that they began to use the library facilities of a nearby university in addition to the high school library. The demand placed upon the university library in terms of services and space was so great that the university had to prohibit further use of the library by high school students. Abt (1970) wrote about students becoming so intensely intersted in simulation games that they went to the school library during breaks to obtain more information so they would be better able to participate in the game.

A statistical study reported by Tansey (1971) indicated that simulation games are effective motivational devices. The experiment was designed to test the feasibility of simulation as a teaching device. It involved forty simulation runs in seventeen schools and included thirty teachers and 2,500 students. The study showed that there was a statistically significant percentage of students who reacted favorably to the simulation. Ninety-five percent of the junior high school students rated simulation favorably. In addition, the teachers indicated high enthusiasm for the simulation games.

In addition to the favorable reaction of students to simulation games, there is some evidence to suggest that more student interest is aroused by simulation games than by the "case study" method. Raser (1969) reported on a study conducted at Northwestern University

which compared the "case study" method and the INS simulation game for effectiveness in arousing student interest and enhancing learning. The two groups of students involved in the study were controlled for intelligence and such personality traits as cognitive style, need for achievement, and affiliation and power. Some of the factors used to indicate student interest included class attendance, visits to the library, and visits to the professor's office. When asked in advance which method they would prefer, most students indicated that the "case study" would be more interesting. However, the behavior of students measured during the study showed that the simulation game generated more interest than the "case study" method.

Why do simulation games heighten students' interest in the subject? What characteristics of simulation games make players so enthusiastic about them? Sharan (1976) suggested that a possible reason for the motivational aspect of simulation games is the pleasure a student derives from actively controlling his role and decisions instead of being a passive recipient of information. Another possible source of motivation is the simulation game's close resemblance to adult society. Sharan (1976) stated "simulation games are taken directly from reality and the 'real-life' elements can be easily identified". Moreover, they portray the adult society to which the student will soon belong. It appears that simulation games encourage participants to make decisions about problems and situations that may arise later in their lives, and this gives them a feeling of gratification.

Not only do simulation games appear to create dramatic representations of the real problem being studied but they can be a kind of caricature of life. Coleman (1966) wrote

> "It appears that for young children games are more than a caricature of life, they are an introduction to life - an introduction to the idea of rules, which are imposed on all alike, an introduction to the idea of aiding another person and knowing that one can expect aid from another, an introduction to the idea of working toward a collective goal and investing one's self in a collectivity larger than himself". (p. 3).

Simulation games: cognitive and affective learning

This section will now examine studies concerning cognitive and affective learning of students who have used simulation games compared to other methods of teaching.

Lucas, Postma, and Thompson (1975) conducted a study comparing the effects of simulation-gaming with lecture-discussion techniques on students' cognitive achievement and retention of facts, concepts and principles. The experimental treatment period consisted of five weeks (twenty-five classroom hours) during which the central group studied United States Domestic History (1870-1915) through the traditional lecture-discussion format and the experimental group studied identical material through simulation-gaming techniques. The study was composed of 294 participants, 158 female and 136 male students. The students had a mean IQ of 106. They were randomly selected and assigned to six control and six experimental classes. Following the study two conclusions were reached:

1. Students in United States History classes exposed to simulation-gaming techniques perform as well on cognitive achieve-

ment measure administered at the conclusion of the experimental treatment period as do students exposed to traditional discussion techniques.

2. Students in United States History classes exposed to simulation-gaming techniques perform significantly better on a delayed-interval posttest measure of cognitive retention than do students in United States History classes exposed to traditional lecture-discussion techniques.

In another study Baker (1968) compared two eighth-grade classes who studied a fifteen-day unit in American History by means of a simulation game with two eighth-grade classes who studied the same material in the traditional manner. The simulation group outperformed the "traditional" group by a substantial margin on a test of factual knowledge given at the end of the unit.

Boocock, Schild and Stoll (1967) compared high school students who played the simulation game "Democracy" for three periods with a control group who read and discussed materials concerning the same content as the two games. The study found that the control group outperformed the experimental group on the tests used to measure learning from the games.

Cohen (1975) conducted a study involving two fifth and two sixth grade classes to compare learning by the traditional teaching methods and learning by involvement in a simulation game. The four classes encompassing 183 students were randomly assigned to treatment (a simulation game) and control groups. The treatment classes acquired their information from involvement in a simulation

game while the control groups were taught the same information by traditional teaching methods. The experimental study was conducted in four consecutive days, and on the fifth day both treatment and control groups were administered a posttest. To measure the retention of information a delayed posttest was given to both groups two weeks after the first posttest.

The study conducted by Cohen (1975) indicated that the treatment group consistently scored higher on the delayed posttest variables than did the control group. The mean score for the treatment group on the Iowa Test of Basic Skills delayed posttest was significantly higher than the mean score for the control group. Cohen (1975) concluded that students taught by a simulation game retained more knowledge than students taught by traditional teaching methods.

The purpose of a similar study by Pascale (1975) was to determine if different methods of instruction affected the short retention of historical facts and critical thinking skills, as measured by acquired concepts and generalizations of eleventh year students in an American Studies Program. The study involved 130 male and 240 female students. From the 240 subjects, 80 were randomly selected to form an experimental group to receive the simulation-gaming treatment, while 80 were randomly selected to form an experimental treatment group known as lecture-question group, and 80 subjects were randomly selected to serve as a control group. The content was presented to both experimental groups and the control group over one week period of time. Afterwards one experimental

group received the simulation-gaming treatment and the other group received the lecture-questions treatment. The control group did not receive either of the treatments. A posttest was administered to all three groups with the following results; the mean score for the simulation gaming group was 82 percent, while the lecture-question group was 56 percent and the control group was 29 percent. A "t" test determined that there was a significance at the .01 level in both short term retention of facts and critical thinking skills of the simulation-gaming group. It was concluded by Pascale (1975) that simulation-gaming students retained a greater number of facts, formed more concepts and acquired more generalizations than the lecture-question students.

While educators are concerned with the positive effect that simulations have on cognitive learning, they believe the real benefit is in the affective domain, theorizing that active involvement learning will have greater opportunity to facilitate attitudinal change. Heitzmann (1974) described several studies conducted by Newman (1974), Anderson (1970), and Palacino (1973) which indicated simulation games are better able to produce positive attitudinal changes than conventional classroom techniques.

Another study conducted by Chartier (1971) hypothesized that subjects who participated in a simulation game with a discussion component would demonstrate higher learning than will subjects participating in simulation without discussion, discussion without simulation, or neither (individual study). The study involved 133 randomly selected undergraduate students. One conclusion of the study

revealed that students who participate in a simulation game with discussion expressed more satisfaction with learning than students participating in a simulation without discussion, discussion without simulation or neither (individual study).

Simulation games: sex, grade level, IQ and role acceptance

One of the hypotheses used by Marts (1975) in his study using simulation games stated that females would achieve to a higher level than males. Using analysis of variance, the results were not significantly different. It was concluded that simulation games taught female and males equally well.

Boone (1972) explored whether or not treatment, sex, grade level, environmental concern, and the interactions of these variables were important factors in the assignment of importance to environmental concept statements. After analyzing the results it was observed that females who used the simulation assigned higher variations to the concept statements than did males who used the simulation.

It appears there is no substantial evidence to suggest a link between sex and learning using a simulation game.

There are several points to consider concerning simulation games and ability levels. McKenney and Dill (1968) designed a study which involved 651 students who were divided into equally sized classes, each of which was to represent the geographical origins, academic backgrounds and social make-up of the total group. The subjects were matched within teams on prior undergraduate performance, graduate entrance examination scores and first-term grades at Harvard. Results of the pre-game and post-game attitude questionnaire suggested

that grouping individuals on the basis of ability or talent affects what they learn from the game ... but over the course of the game satisfaction held up much better for the above average groups than for the average and below average. Following the study McKenney and Dill (1968) stated that grouping students so that they are homogeneous in ability has serious drawbacks. Furthermore, they would recommend against any method of grouping that puts the weaker members of a class together on teams.

Boocock and Schild (1968) conclude that:

> "consistent empirical evidence shows that the relationship between learning in a game situation and performance in school setting ... is very weak" (p. 256).

This suggests that a student who performed poorly in conventional work is as likely as any other student to do well at learning in a simulation game. However, according to the studies of Edwards (1971b), Magnelia (1969), Muhlerin (1971) and Fletcher (1968) reported by Livingston and Stoll (1973) high ability level participants in simulation games showed greater understanding of the analogies between the game and the real situation than did the low ability students. In addition students of high ability were better at perceiving the consequences of the rules of the game than the low ability students. However, on measured performance during a simulation game, the low ability students outscored the high ability students.

Role change effect

An advantage claimed for simulation games is the role change that they provide for the teacher. The teacher is no longer seen by the students as their judge because the interactions which the student makes within the game determine his success or failure. Boocock and

Coleman (1968) stated "in games the discipline arises internally from the necessity to obey if the game is to continue" (p. 219). Livingston and Stoll (1973) wrote that most simulations affect the student - teacher relationship. The teacher serves as an interpreter and observer, explaining the rules and posing questions, and noting points that will have to be made when the classes discuss the game. Furthermore, because the teacher is not grading the student, the tension between them is reduced. In simulation games students learn quickly and naturally about the results of their decisions, without feeling that they are being judged. Sharan (1976) stated that "it resembles real-life feedback mechanisms, since results are usually our source of knowledge about our activities; in adult societies there are no good marks from the teachers". In addition, the player's information about his results comes from the participants, his peers, rather than from the teachers.

Summary

It is recognized that all relevant research studies have not been included in this survey. Furthermore, there is the realization that investigation biases were reflected in the selection and reporting of findings. However, the investigation of simulation games appear to substantiate the following:

1. Simulation games are effective techniques in positively changing student attitudes and opinions.

2. Simulation games appear to be as effective as other methods for teaching factual knowledge and intellectual skills.

3. The majority of students indicated they preferred simulation games to traditional classroom activities.

4. Immediate feedback on actions and their consequences in a simulation game permits participants to see cause and effect relationships and provides a link between thought, action and participation.

5. Simulation games obtain and maintain student attention and interest.

6. Homogeneous grouping in simulation games can have serious drawbacks.

The literature review has cited studies concerning reactions of participants to simulation games on several variables. The writer proposes to develop a simulation game to be used by high school students in the area of social studies. Grade nine and ten students will participate in playing the developed simulation game. After playing the game each student will complete the game's questionnaire. Analysis of the questionnaire will enable the writer to compare the results of the reactions of students according to grade level, intellectual quotient and sex differences. The researcher will endeavour to ascertain if some of the trends in the study concur with findings of other researchers.

The purpose of the study

The purpose of this study is to evaluate a researcher produced simulation game. The following question will be investigated: Will the simulation game "Negotiation" significantly change cognitive outcomes of grade nine and ten students when sex differences, intellectual quotients, and grade levels are taken into account?

Definitions

For the purpose of this study the following terms will be defined as:

Simulation: A simulation is defined as

> "an operating model, a reproduction or imitation of the physical or social phenomena consisting of a set of interrelated factors which function together in essentially the same manner as the actual or hypothetical system (Boocock,1968, p. 4)".

Simulation game: A simulation game as the name implies contains characteristics of both a simulation and a game. It is defined as

> "an activity in which participants interact within an artificially produced environment which recreates some aspects of social reality. The participants, termed players, assume roles of individuals or groups who exist in the particular social system being simulated. Their goals and those of the actors they represent are the same (Maidment and Bronstein, 1973, p. 6)".

Game: A game is defined as

> "as activity in which people agree to abide by a set of conditions in order to achieve a desired state or end (Shirts, 1972)".

Role play: It is defined as a structured extention of play. It is trying out first person action in a situation.

Sociodrama: .. role playing as a means of seeking a solution

to a social problem (Gibbs, 1974)".

Simulators: .. designed to represent a real situation, to provide a student with control over that situation, and to vary conditions during training, so that the task can be made progressively more difficult (Gibbs, 1974)".

Case study: .. present a problem for discussion, derive the problem from previous events and typically deal with problems involving people (Gibbs, 1974)".

Interaction: .. flow of resources and information to and from each player (Gibbs, 1974)".

Data bank: .. a retrieval centre for information needed during the actual playing of a simulation game.

Significance of the study

In the past decade there has been some concern expressed about traditional teaching methods. Raser, (1969) reported that the findings of social and political theorists suggest that a large proportion of the adult population felt their educational experiences did not adequately prepare them for the world in which they live. Furthermore, the apathy and boredom of students, and the fact that many of them quit before completing high school is a major concern of educators. Adding to the dilemma is the evidence which suggest the future will be more complete because of the explosion of knowledge and the transformation of the technological and social environments.

It appears that if the objective of preparing students for the future is to be achieved, more realistic methods of teaching

and classroom instruction will have to be examined. Raser, (1969) maintained that educators insist that knowledge of complex systems will have more value and be more relevant than specified skills or expertise in a single subject. Gillispie, (1973) suggested that simulation games give the student a chance to learn about systems and their complexities by writing the following:

> "In the best simulation games this mood allows participants to examine complex systems of interaction in their complexity, rather than an isolated entities, to engage in rational decision-making procedures and approach problems from the perspective of several disciplines (p. 4)".

Simulation games have been used successfully in the social studies area. Walford (1971) reported that simulation games have begun to take their place in the study of geography as aids to understanding fundamental ideas in geography.

By developing a simulation game that could be used in the social studies high school program, the writer would be aiding the educational endeavour of many teachers who desire to use simulation games in the classroom. Furthermore, a simulation game would give students an opportunity to learn, as in real life, the issues involved in the problem being simulated.

CHAPTER II

BACKGROUND INFORMATION OF THE FISHERIES

The following chapter presents a résumé of the major issues of the Law of the Sea Conferences from 1958 to 1975 and includes a brief literature review of the fishing efforts off Canada's east coast.

The seas which cover more than two-thirds of the earth's surface form a vital part in the ecosystem of the entire world. The microscopic plants which live in the seas produce by photosynthesis a large percentage of the earth's oxygen which is essential for all life. These microscopic plants, the phytoplankton, are believed to be the basis for the marine food chain, at the top of which we find the fish and other living resources on which man depends.

It appears that if marine ecosystems are to be maintained in their present form, man will have to harvest the stocks of marine life at a rate that will permit their continuing reproductions. Furthermore, the oceans and their environments will have to be managed to keep them free from dangerous levels of pollution. However, since one nation cannot enforce pollution controls on another nation, management cannot be accomplished by nations acting independently. The only solution appears to be the establishing of an international body that would enforce strict scientific controls of the seas and their resources.

International bodies have been trying to arrive at solutions concerning the seas and their resources for several years. The first Law of the Sea Conference was held during 1958 and resulted in four international conventions, all of which dealt with issues of renewable

resources utilization. The Canadian Department of the Evnironment (1973) listed the four conventions as being: the Geneva Convention on the High seas, the Territorial Sea and Contiguous Zone Convention, the Fishing and Conservation of Living Resources Convention, and the Continental Shelf Convention. Apparently the 1958 Law of the Sea Conference failed to reach agreement on two vital questions: the breadth of the territorial sea, and the nature and limits of jurisdiction over the fisheries adjacent to coastal states.

Two years later in 1960 a second Law of the Sea Conference was convened. Canada played a major role at the 1960 conference in attempting to extend the rights of the coastal states. However, the two questions which concerned the 1958 conference remained unsettled.

Canadian delegates' efforts to obtain agreement from other nations on extending Canada's jurisdiction to nine miles had been unsuccessful, and it was evident that action would have to be taken without international agreement. This action occurred in 1964 when Canada declared a nine-mile contiguous fishing zone adjacent to the territorial sea. The Canadian Department of the Environment (1973) stated that the contiguous fishing zone gave Canadians exclusive rights out to twelve miles.

Canada further developed its control of the territorial sea in 1970. The Canadian Department of the Environment stated:

> "In 1970 Canada declared a 12-mile territorial sea and also established a series of fishing closing lines giving Canadian exclusive rights to fish in the Gulf of St. Lawrence, Bay of Fundy, Queen Charlotte Sound, Hecate Strait, and Dixon Entrance"(p. 4) .

Canada also took special measures in 1970 to protect the marine environment of the Arctic by declaring a 100-mile pollution prevention

zone. There are indications that the Arctic is very sensitive to pollutants, and if a major oil spill occurred there it could be disastrous to the marine life.

The two Law of the Sea Conferences held in 1958 and 1960 respectively encouraged international thinking about agreements on the oceans regarding living and non-living resources. In the late 1960's the United Nations established the Seabed Committee to study the need for reserving the seabed and ocean floor beyond the limits of national jurisdiction for exclusively peaceful purposes. These efforts were further realized in 1970 when the United Nations decided to convene a third Law of the Sea Conference to begin late in 1973. The organizational meetings established the working rules and the actual sessions were to begin in Santiago, Chile in April, 1974. However, certain organizational problems determined that the third Law of the Sea Conference be held at Caracas, Venezuela, two months later.

The Law of the Sea Conference at Caracas was characterized by a split between the developed countries on one side and the developing countries on the other on certain issues. According to Buzan (1974) the various groups formed one of the most important elements of the negotiations. Members of the Coastal group, for example, produced an integrated set of draft articles on the territorial sea, archipelagos, the exclusive economic zone, and the continental shelf. Members of the landlocked and geographical-disadvantaged group presented draft articles on their right to participate in exploitation of the living and non-living resources of their coastal neighbors. According to Buzan (1974) while many states supported their claim to participate in fishing, there were strong objections to the sharing of continental resources, especially oil.

Canada, at the Third Law of the Sea Conference, stated its position on a number of issues, the main ones being: control over fisheries in a zone of 200 miles from its coast; control over the sea-bed out to 200 miles or to the margin of the continental shelf, whichever was greatest; control over archipelagic waters; and pollution control within the economic zone. Most of these issues were opposed by different nations, especially the distant-water fishing states. Canadian delegates argued that the 200-mile exclusive economic zone would help in solving the fisheries problem.

Davies (1974) argued on the following points:

> 1. Coastal stocks must be managed on a scientific and functional basis which means they must be managed as a whole. Appropriate recognition must therefore be given to the interests of the coastal state with regard to these stocks in areas adjacent to the economic zone.
>
> 2. To ensure adequate protection and proper management of the anadromous stocks such as salmon, fishing for these species must be prohibited outside the economic zone.
>
> 3. We need comprehensive management of wide-ranging stocks such as tuna and whales. We must accommodate the authority of the Coastal State over such stocks when they are found within the economic zone. Canada believes this balance of interests can be struck by cooperation between the relevant international commissions and the Coastal States concerned.
>
> 4. Finally, to ensure optimum utilization of the living resources of the economic zone (as distinct from those of the Continental Shelf), foreign states should be allowed to fish for the surplus of stocks not reserved for the Coastal State.

Canada appeared to have reason to argue for control of the continental shelf by the Coastal State because there were indications that fish stocks off its coast had declined seriously since 1968. (See Appendix 1 for fishing statistics). Although the fishing off Canada's east coast had been controlled by the International Commission for the North-west Atlantic Fisheries (ICNAF) since 1949 there was reason to believe that the controls were not adequate.

ICNAF, which is comprised of sixteen member countries including the United States and Canada, was formed for the purpose of managing the western Atlantic fishery resources on a maximum-sustainable-yield basis. Logan (1974) maintained that ICNAF's effectiveness as a conservation organization is seriously hampered by the need for unanimity in making policy. ICNAF is also hindered by the lack of adequate inspection and enforcement procedures. Logan (1974) explained that ICNAF does not have an independent scientific staff and must rely upon the advice of experts employed by individual member nations. For these and other reasons ICNAF has failed to control the fishing effort by certain member countries during the last fifteen years. Apparently, according to Logan (1974) certain species of fish which are of vital importance to Canadian and U.S. fishermen have been decimated. The most obvious specie is haddock. (See appendix for haddock statistics). For Canada and especially Newfoundland there appears to be a direct relationship between the off-shore fishing effort by foreign draggers and a decline in the inshore fishery.

Templeman (1966) maintained that since 1960 European trawlers have trawled winter and spring on the prespawning, spawning and post-spawning concentrations of cod on the southern Labrador Shelf. Furthermore, the autumn trawling on the southern and southwestern parts of the Hamilton Inlet Bank is fairly close to shore. As a result of increased fishing effort by European trawlers, the cod landings taken from ICNAF areas off Labrador increased from four percent of ICNAF landings in 1955-58 to fifteen percent in 1959 - 61, and eighteen percent in 1961-64. Furthermore, Templeman (1966) stated:

> "tagging has shown that this deep water, winter-catch includes large numbers of cod which after spending winter in deep water move shoreward in late June and early July to provide for the coastal fishery (p. 29)".

According to Templeman (1966) the off-shore fishery affects the inshore fishery of Labrador and Northern Newfoundland by reducing both quantities and size of cod.

The Labrador cod stock is large and fish experts believe there are several sub-stocks within the stock. This cod stock moves inshore during summer and moves off-shore again in autumn. The IGNAF areas affected by the Labrador cod stock range generally from 2G to 3K. (See appendix 1 from map of North Atlantic).

Other stocks of cod are found on the Grand Bank in ICNAF areas 3L, 3N and 3O; the Flemish Cap in ICNAF area 3M; St. Pierre Bank in ICNAF area 3Ps; and the western Newfoundland cod stock in the Gulf of St. Lawrence.

Other species of fish and their movements have also been monitored. Scientific research reported by Memorial University of Newfoundland Extension Service (1973) indicated that water temperature, type of bottom, and feeding habits affect the movement of different species of fish. It appears that scientists have sufficient data to be able to specify the quantity and species of fish that should be caught in each ICNAF area.

At the continuation of the third Law of the Sea Conference at Geneva, during May, 1975, Canada again pressed for control of the fisheries within a 200-mile zone around its coast. However, according to the United Nations (1975) the 200-mile zone was not obtained. After this failure certain Canadians contended that Canada should unilaterally

declare a 200-mile zone in order to save the fishery. The Evening Telegram (1975) stated:

> "Canada is unable to wait any longer and should declare a 200-mile exclusive economic fishing zone immediately in order to save the east coast fishery (p. 3)".

However, Canadian delegates continued to work within the frame of the international commission (IGNAF) and during January, 1977 arrived at agreements with major fishing nations. The agreements made it possible for Canada to declare a 200-mile fishing zone and have limited control over other nations fishing within the zone. Although the fish quotas for each nation will have to be set by an international body, there is reason to believe that Canada will gradually obtain more control of the 200-mile zone.

CHAPTER III

DEVELOPMENT OF THE SIMULATION GAME "NEGOTIATION"

METHODS AND PROCEDURES

Included in the following chapter is an outline of the steps taken in designing the simulation game "Negotiation". Furthermore, the chapter deals with some of the difficulties encountered during the developmental stages, and in administering the game to high school students.

The simulation game model

The game plan model proposed by Maidment and Bronstein (1973) and used by the writer in developing the simulation game "Negotiation" involves seven steps.

Step 1. Elect a Game Approach

In electing a game approach the writer had to consider the objectives of the instructional media, determine the needs of the students, and select the type of simulation game to be used.

Step 2. Prepare Game Objectives

The second step involved determining the specific problems to be studied and keeping the problem within a specified scope of operation. The broad and specific objectives were outlined to give the game an ordered structure.

Step 3. Collect Data for Game Model

In selecting the data, it was necessary to identify sources, collect from appropriate sources, and organize the material. When the above was completed, the writer searched for an applicable game model. The game model proposed by Maidment and Bronstein (1973) which gives a

step by step outline of operations involved in designing a game was selected.

Step 4. Design Game Model

A developer designing or adopting a game model has to weigh several pertinent factors such as identifying the participants' roles, their goals, and interactions which will occur during the simulation game. Furthermore, the roles, goals, and interactions have to be adapted to a particular game structure.

Step 5. Develop Game Materials

During the fifth step the game's materials are organized, roles defined and game rules are formulated. In addition, supplementary materials may be added to fill apparent gaps in the simulation game.

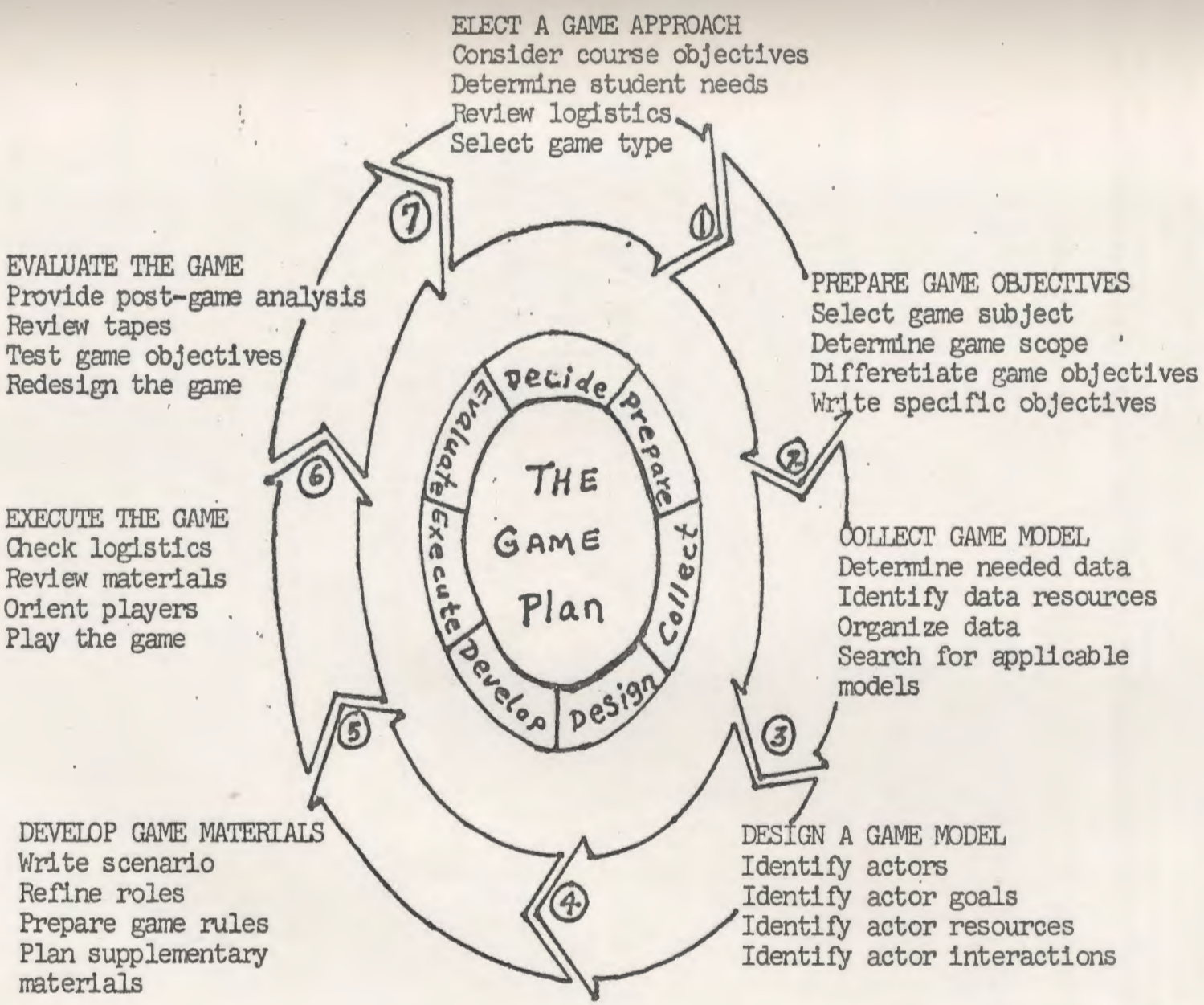
Step 6. Execute the Game

Involvement of participants in playing the game requires that control familiarize all players with the simulation game by explaining rules and regulations; by providing an appropriate setting and arrangement for playing; and by ensuring that the game is played according to the game plan.

Step 7. Evaluate the Game

Evaluation of the simulation game implicates a postgame analysis by control to assess the areas of the game that could be improved and obtain participants' reactions to the game. The reactions of the participant can be important in making minor changes to the game. Steps 6 and 7 may have to be repeated several times to remedy flaws in the game.

THE GAME PLAN



Development of the simulation game "Negotiation"

It has become apparent that the oceans of the world are becoming increasingly important not only for their vast food supplies, but also for their valuable minerals. The Law of the Sea Conference held at Geneva, 1975 identified the main issues as mineral rights under the oceans, pollution of the oceans, management of the fisheries, and passage of warships through strategic waters. Although there was not a consensus reached at the Geneva Law of the Sea Conference as to giving coastal nations complete control over continental shelf waters, it was apparent that most nations believed the coastal states should have some degree of control.

The writer believed a simulation game which would involve participants in making decisions about issues concerning a country, such as Canada, obtaining a 200-mile exclusive economic zone would be a good method to teach the concept of a 200-mile limit. A simulation game would utilize role playing techniques and present the problem as in a real life situation. The participants would become aware that it is a problem that they must endeavour to solve by in-group and between group interactions.

The simulation game "Negotiation" created an awareness of the many issues involved in both obtaining and managing a 200-mile zone. By participation in the simulation, the students would be made aware of the viewpoints of other nations in a realistic manner.

Since the problem is relatively complex, the simulation game was designed for high school students and could be used in conjunction with the social studies program in these grades.

The ideal would have been to simulate a Conference on the Law of the Sea, involving every country and the viewpoints of each. However, this was not possible. Instead, the writer chose seven countries whose viewpoints gave a cross-sectional view of the diversity of opinions that existed at the Conferences on the Law of the Sea at Caracas (1974) and Geneva (1975). The information was gained by reading reports from both conferences and from reading viewpoints of delegates and reporters at both conferences.

When the writer decided on a topic of international relations, a game model, which consisted of delegates from different countries meeting to discuss vital world issues, was formulated. After a review of several simulation games, it was decided to center the simulation game "Negotiation" around the concept of data-banks. This meant that the seven countries, each comprised of four delegates, would have access to a data-bank where information was available to enable them to make a realistic decision concerning the proposed problems. To obtain information from the data-bank, the country's delegates would have to present a written question to Control requesting specific information. If the information was available, a card from the data-bank containing the requested information would be given to the country's delegates.

To ensure (after Control had arranged the game's setting and the information concerning the playing of "Negotiation" had been given out to the participants) that the game would not stagnate at that point, each role card contained a basic question that the participant should first endeavour to answer. This gave each country four different

questions which could be directed to Control to get the game started. Furthermore, to help ensure that the country's delegates continued to ask questions, each data-card alluded to additional information which possibly could be found in the data-bank. Each country had its own data-bank, but the information contained in each data-bank was identical.

During the playing of "Negotiation" rather than having several delegates standing at Control waiting for the requested information to be given to them, it was decided to have the delegates of each country bring his requests and leave them near the data-bank of his respective country. Then, after Control had located the data-card containing the requested information, each delegate would be signaled to pick up the data-card. If the requested information was not available, Control would relay this information to the delegate.

Time allotments were another consideration since the game would need three to five 40-minute periods to complete a playing period. For example, how could Control regulate the game if only one 40-minute period at any one sitting was available. This problem was experienced with a university class when the simulation game "Negotiation" was played over a three day period. The problem was solved by collecting in all the information given out, and keeping each country's information in a separate folder. Also, the data-cards were collected and kept separate from those in the data-bank so that at the beginning of the next playing period they could be given back to the respective countries.

It can be speculated that the gaining of information from the data-banks would stimulate discussion and interaction within groups, but not between groups. To provide an avenue for interaction between

groups, several time periods during the game's playing period were designated for talks and discussions to occur between countries. For example, the Chief Negotiator of Opikland could confer with the Chief Negotiator of Translandia to try to find out the views of Translandia on a particular issue.

The names of the countries, place names, and names for the fishing banks were obtained from readings and from colleagues. For example, Translandia was selected to represent the large country of the U.S.S.R. while Gadus, the scientific name for cod, was chosen for the island depicting Newfoundland.

A map was required that would be similar to the east coast of Canada but would be sufficiently different so that it would not be readily identified as a representation of the particular area. The desired shape of the map was finally produced by tracing several countries of South America and Europe and fitting the countries together in a suitable manner. After the writer produced the map on a large scale drawing, it was taken to the graphics division of Memorial University and reduced to the specified dimensions.

Instrumentation and analysis procedures

This section will review how the instrument (the questionnaire) used in the study was developed and validated. The questionnaire was designed to investigate the participants' perceptions and reactions to the developed simulation game "Negotiation".

To develop the questionnaire, the writer consulted with two social studies experts. In addition, questionnaires, checklists, and strategy sheets were studies and analysed to aid the writer in the

creation of a suitable questionnaire. These included the questionnaire of the study conducted by Groome (1974) on the Life Career Simulation Game; the checklist of Guetzkow and Cherryholmes (1966) used in the Inter-Nation Simulation Kit; the questions proposed by Mastrude and Grant (1969) for the simulation game Mini-City.

Analysis of the questionnaires mentioned above helped the writer decide what items should be included in the questionnaire for the simulation game "Negotiation". (See Appendix B for the identification of main areas.) Furthermore, those items were examined and scrutinized by university faculty and graduate students in social studies to detect weaknesses and flaws in the questionnaire.

The first draft of the questionnaire included seventeen multiple-choice questions with each question having three choices, and three open-ended questions. The questionnaire was then analysed by the social studies experts and post-graduate students who made further changes and revisions. Some of the changes included the deleting of item 14 since it was almost identical to item 3, and revising the wording in items 3, 4, 5, and 12 to make the statements more precise. The revised questionnaire consisted of 16 multiple-choice questions and 4 open-ended questions.

During the pilot testing with Class A and Class B, several words were changed to give students clearer understanding of what the questions meant. In item 3 "How would you" was changed to "You would"; in item 4 "Do you consider" was changed to " In your opinion"; in item 12 "How do you consider" was changed to "How do you rate". It appeared that the above changes were adequate and no other changes were made in the questionnaire.

Another evaluation instrument used in the study was an Otis-Lennon test which was used to collect intellectual quotients of students involved in the study. According to Milholland (1972) the construction and norming of the Otis-Lennon test adhered to the highest levels of current standards and is a product of exceptional merit. The standardization sample was well chosen and for grades 1 - 12 the sample per grade varied in size from 11,866 to 14,746. Scores on the Otis-Lennon test may be expressed as deviation IQ's and as age and grade percentile ranks and stanines. The standard errors of measurement, based on alternate-forms reliability estimates for IQ's from the Otis-Lennon vary from 3.9 to 7.0 points (Milholland, 1972). Furthermore, the test correlates adequately with educational criteria and with other measures of general scholastic aptitude.

To analyse the data, the writer utilized the Chi Square for Correction of Continuity which is recommended by Blalock (1972) whenever the expected frequency in any cell falls below 10. The formula for the Chi Square for Correction of Continuity is

$$X^2 = \frac{N\left(ad - bc - \frac{n}{2}\right)^2}{(a + b)(c + d)(a + c)(b + d)}$$

Comparisons of the reactions of grade nine students to the simulation game "Negotiation", according to sex and intellectual quotient, were analysed by means of the Chi Square for Correction of Continuity.

To compare the reactions of grade ten students according to sex and intellectual quotient, the sixteen items of the questionnaire were analysed by the Fisher Exact Test. Blalock (1972) stated that in

the case of 2 x 2 tables, where N is small, it is possible to use the Fisher Exact Test which gives exact rather than approximate probabilities. Furthermore, the Fisher test is most useful in cases of very small N's or whenever the total sample size is moderate but one or more of the marginals is very small. The formula for the Fisher Exact Test is

$$P = \frac{(A + B)!\ (C + D)!\ (A + C)!\ (B + D)!}{N!\ A!\ B!\ C!\ D!}$$

The level of significance for both the Chi Square and the Fisher test was .05.

Descriptive hypotheses used in the study

The following descriptive hypotheses were used in the study:

1. Is there a difference between the reactions of grade nine high school students to the simulation game "Negotiation" according to sex differences?

2. Is there a difference between the reactions of grade nine high school students to the simulation game "Negotiation" according to intellectual quotient?

3. Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to sex differences?

4. Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to intellectual quotient?

5. Is there a difference between the reactions of high school students to the simulation game "Negotiation" according to grade level?

Administration of the simulation game "Negotiation"

Formulation and construction of a simulation game was insufficient to the present investigation and some means of evaluating whether the game could be successfully used in a school situation had to be determined. The method selected was a formative evaluation procedure and as the term implies, evaluation occurred at several stages (Bloom, Hastings, and Madaus, 1971).

After the initial design of the simulation game had been completed, the writer selected two high school classes in Stephenville to participate in the game during June, 1975. The Principals of the two high schools were friends of the investigator, and were quite willing to make the necessary arrangements for students to participate in the study. The Principal at School "A" made provisions for students in the academic grade nine class, and the Principal at School "B" selected a grade ten class. The grade nine class was comprised of students with high academic skills, whereas the grade ten class was comprised of students ranging from low to high academic skills.

Arrangements were made with the Principals of both schools for blocks of class time of three forty-minute periods. After arriving at School "A", the Principal introduced the writer to the classroom teacher and the pupils. The classroom teacher stayed with the investigator to help in the organization of the class during the first period.

After giving an introduction on the simulation games with special emphasis on the simulation game "Negotiation", seven groups of students were selected. Each group had four students. Since the writer

had previously explained to the students that the person who would play the role of Chief Negotiator would have to argue points of discussion and present the proposal at the end of the game, the selection of this role was done very honestly by the class. The honesty of their choices was proven later in the game when the writer discovered that the two students who were selected by the class had high intellectual scores and also debated well during the playing of the game. The writer guided the selection by ensuring that each group was comprised of male and female students. When the groups were chosen, and the country name assigned to each, packages of the game's materials were distributed to the different groups. Each country group studied and discussed these materials for approximately fifteen minutes which completed the first forty-minute period.

At the end of the first period, the class moved to the school's cafeteria to provide more space for playing the game. The country groups were widely separated in the cafeteria which meant that the discussions within the groups were fairly secret. The first phase of the playing of "Negotiation" ended after three forty-minute periods, and the game's materials were collected.

The second phase of the playing of the simulation game "Negotiation" occurred on the following day at School "A" and continued for three forty-minute periods. At the end of the playing phase, each group was asked to prepare a proposal for presentation to the class. After the presentations, voting by secret ballot was conducted to decide which group presented the best proposal. In the presentations, the participants expressed their arguments concerning their decisions and learned from each other. The investigator then debriefed the class on

the playing of the simulation game concerning their mistakes, their methods of attacking the problem, and general learning of the game. The debriefing period stimulated class discussions about "Negotiation" on how they learned or failed to learn from the game. Following the post-game analysis, each student who participated in the game completed the game's questionnaire. The writer asked each participant to be especially critical regarding the game in the open-ended questions so that the suggestions could be used to further improve the game.

The second run of the simulation game "Negotiation" began Thursday morning, June 5, 1975, at School "B". The writer followed similar procedures as those carried out at the other high school. However, since the class had only fifteen students, the investigator decided to use five countries and three roles in each country group. A selection was made to include the most powerful fishing nation, the richest nation, the poorest nation, a middle power fishing nation, and Opikland, the country most central to the simulation game.

In consulation with the classroom teacher, the investigator selected the groups and the group leaders and ensured that each group was comprised of male and female students. After the seating was arranged in the Social Studies classroom with each participant in his group, the materials for each country was distributed. The participants were asked to study the materials for fifteen minutes and to ask questions concerning the game.

During the playing of the game at School "B", the writer gave more time for interaction between groups than had been provided with the grade nine class. Most interaction between groups was done for experimental reasons to find out the reactions of students. The grade ten class

finished the playing of "Negotiation" in five forty-minute periods, one period less than the grade nine class. After the grade ten class completed playing "Negotiation", the writer debriefed them on the game and administered the game's questionnaire to each participant. The writer followed the same procedure in both the grade nine and grade ten classes.

Limitations of the study

The limitations of the study are recognized as the following:

1. It is an observational survey report.

2. A descriptive analysis of the results is given and the writer realizes there may be other interpretations.

3. The study is limited to thirty grade nine students and twelve grade ten students.

4. The sample was limited to forty-two subjects comprised of twenty-three male and nineteen female students who were selected from two high schools of the same town.

CHAPTER IV

RESULTS OF THE STUDY

In this chapter the analysis of the results of the study are considered in relation to the five descriptive hypotheses presented in Chapter III.

Analysis of the descriptive hypotheses

Hypothesis 1: Is there a difference between the reactions of grade nine high school students to the simulation game according to sex differences?

Table I indicates that female students produced higher percentages than the males on ten of the sixteen items. There were significant differences on items 4, 5, 6 and 10. The significant difference in item 4 indicates that the grade nine female students were more highly involved than the males in the simulation game. Item 5 suggests that the females conceptualized their roles significantly better than the males. Furthermore, item 6 suggests significant differences in the liking of role playing of grade nine male and female students. The significant difference of reactions of grade nine male and female students to the simulation game appears to be strongly indicated in item 10. Ninety-two percent of the female students stated definitely they would replay the simulation game "Negotiation" but only fifty percent of the male students gave the same positive reply.

Although there was no significant difference, the percentages of item 16 indicated that for a choice of learning, a greater percentage

TABLE I

RESPONSE OF GRADE NINE STUDENTS BY SEX

Questions	Response	Sex		X^2
		M N = 18	F N = 12	
		%	%	
1. Adequacy of the introduction	Excellent	11	33	3.83
2. Preparation by teacher is necessary	Very definitely	83	67	0.380
3. Contents of the simulation game	Interesting	100	100	
4. Student involvement in the game playing	Highly involved	50	83	*5.02
5. Personal rating of role playing	Well	33	75	*6.81
6. Liking of role playing	very much	39	83	*7.47
7. Perceived role playing by others	Well	44	58	1.25
8. Perceived learning	Well	44	42	0.051

TABLE I

Page 2

Questions	Response	Sex M N = 18	Sex F N = 12	X^2
9. Perceived use of simulation games for teaching	Very definitely	78	83	0.973
10. Would replay "negotiation"	Very definitely	50	92	*7.656
11. Length of introduction	Remain as is or be shorter	66	75	0.006
12. Difficulty of simulation game	Very difficult to manageable	78	75	0.069
13. Frequency of the use of simulation games	Should be used more often	83	83	0.25
14. Perceived change of opinion as a result of playing the simulation game	Vey definitely	39	33	0.156
15. Data-Bank information	Complete	22	42	2.387
16. Choice of learning method	Simulation game	56	75	2.159

NOTE: X^2 = 3.84 for significant difference

* Significant difference

of the female students than males probably would select a simulation game rather than a film or study in the library.

Hypotheses 2: Is there a difference between the reactions of grade nine high school students to the simulation game "Negotiation" according to intellectual quotient?

Table II appeared to indicate that grade nine students whose intellectual quotients were 110 or higher, produced greater percentages than grade nine students whose intellectual quotients were 109 or below on ten items in the questionnaire. Those percentages may suggest that the higher intellectual group found the simulation game more interesting and may have been more highly involved participants than the lower intellectual group. Furthermore, the indications seem to suggest that the higher intellectual group perceived the use of simulation games in the classroom differently than the lower intellectual group. Although there were little percentage differences in most of the items, the lower intellectual group appeared to indicate greater importance of preparation before playing the game than the higher intellectual group.

Hypothesis 3: Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to sex differences?

Table III seems to suggest very little difference between male and female students in grade ten. Although the females produced higher percentages than the males on twelve of the sixteen items in the questionnaire, only item 14 indicated a difference that was significant. Item 14 appeared to indicate a significant difference between the perceived change of opinion of male and female students in grade ten. Furthermore, item 2 suggested that male grade ten students may not have believed as strongly

TABLE II

RESPONSE OF GRADE NINE STUDENTS BY IQ

Questions	Response	Intellectual Quotient 110+ N = 14	Intellectual Quotient 109- N = 16	x^2
1. Adequacy of the introduction	Excellent	7	31	*4.428
2. Preparation by teacher is necessary	Very definitely	79	69	0.252
3. Content of the simulation game	Interesting	100	94	0.018
4. Student involvement in the game playing	Highly involved	71	63	0.017
5. Personal rating of role playing	Well	29	25	0.129
6. Liking of role playing	Very much	57	50	0.005
7. Perceived role playing by others	Well	43	50	0.576
8. Perceived learning	Well	43	78	1.76

TABLE II

Page 2

Questions	Response	Intellectual Quotient 110 + N = 14 %	Intellectual Quotient 109- N = 16 %	X^2
9. Perceived use of simulation games for teaching	Very definitely	93	82	0.156
10. Would replay "Negotiation"	Very definitely	71	75	0.037
11. Length of introduction	Remain as is or be shorter	36	19	0.681
12. Difficulty of simulation game	Very difficult to manageable	86	69	0.920
13. Frequency of the use of simulation games	Should be used more often	93	88	0.015
14. Perceived change of opinion as a result of playing the game	Very definitely	36	31	0.018
15. Data-Bank information	Complete	36	38	0.231
16. Choice of learning method	Simulation game	79	81	0.410

NOTE: X^2 = 3.84 for significant difference * Significant difference

TABLE III

RESPONSE OF GRADE TEN STUDENT BY SEX

Questions	Responses	Sex M N = 5 %	Sex F N = 7 %	P
1. Adequacy of the introduction	Excellent	0	29	0.318
2. Preparation by teacher is necessary	Very definitely	60	86	0.318
3. Contents of the simulation game	Interesting	80	100	0.416
4. Student involvement in the game playing	Highly involved	60	14	0.141
5. Personal rating of role playing	Well	60	43	0.152
6. Liking of role playing	Very much	40	43	0.252
7. Perceived role playing by others	Well	20	43	0.354
8. Perceived learning	Well	20	71	0.244

TABLE III

Page 2

Questions	Response	Sex M N = 5 %	Sex F N = 7 %	X^2
9.. Perceived use of simulation games for teaching	Very definitely	60	86	0.318
10. Would replay "Negotiation"	Very definitely	40	71	0.265
11. Length of introduction	Remain as is or be shorter	20	29	0.477
12. Difficulty of simulation game	Very difficult to manageable	80	100	0.416
13. Frequency of the use of simulation games	Should be used more often	80	71	0.119
14. Perceived change of opinion as a result of playing the simulation game	Very definitely	0	57	*0.012
15. Data-Bank information	Complete	40	0	0.152
16. Choice of learning method	Simulation game	60	100	0.152

NOTE: $P \leq .05$ for significant difference * Significant difference

as the females about adequate preparation for playing the simulation game "Negotiation".

Hypothesis 4: Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to intellectual quotient?

An analysis of Table IV suggested grade ten students having an intellectual quotient of 100 or higher, indicated they found the simulation game more interesting, liked and played their roles better, perceived they learned better and perceived a change of opinion to a greater extent than did the lower intellectual group. The significant difference in item 9 of Table IV suggested that the higher and lower intellectual groups appeared to react quite differently regarding the use of simulation games in the classroom. Item 12 suggested that the lower intellectual group appeared to find the simulation game "Negotiation" more difficult than the high intellectual group. Furthermore, the result of the response to item 16 appeared to reflect some difficulty that the lower intellectual group may have encountered with the simulation game "Negotiation" because only 67% indicated they would probably choose a simulation game. However, 100% of the higher intellectual group implied they conceivably would select a simulation game to learn a certain concept when the choices were study in the library, a film, and a simulation game.

Hypothesis 5: Is there a difference between the reactions of high school students to the simulation game "Negotiation" according to grade level?

A survey of Table V appeared to suggest that grade nine students may have been more positive than the grade ten students in their reactions

TABLE IV

RESPONSE OF GRADE TEN STUDENT BY IQ

Questions	Response	Intellectual Quotient 100+ N = 6 %	Intellectual Quotient 99- N = 6 %	P
1. Adequacy of the introduction	Excellent	17	17	0.545
2. Preparation by teacher is necessary	Very definitely	100	67	0.454
3. Contents of the simulation game	Interesting	100	83	0.500
4. Student involvement in the game playing	Highly involved	17	50	0.242
5. Personal rating of role playing	Well	67	33	0.244
6. Liking of playing roles	Very much	67	33	0.244
7. Perceived role playing by others	Well	33	33	0.455
8. Perceived learning	Well	67	33	0.244

TABLE IV

Page 2

Questions	Response	Intellectual Quotient 100+ N = 6 %	Intellectual Quotient 99- N = 6 %	P
9. Perceived use of simulation games games for teaching	Very definitely	67	83	*0.045
10. Would replay "Negotiation"	Very definitely	67	50	0.757
11. Length of introduction	Remain as is or be shorter	33	17	0.409
12. Difficulty of simulation game	Very difficult to manageable	83	100	0.500
13. Frequency of the use of simulation games	Should be used more often	83	67	0.409
14. Perceived change of opinion as a result of playing the simulation game	Very definitely	50	17	0.242
15. Data-Bank infromation	Complete	17	17	0.545
16. Choice of learning method	Simulation game	100	67	0.227

NOTE: P .05 for significant difference * significant difference

TABLE V

RESPONSE OF GRADE NINE COMPARED TO GRADE TEN STUDENTS

Questions	Response	Grade 9 N = 30 %	Grade 10 N = 12 %	X^2
1. Adequacy of the introduction	Excellent	20	17	0.467
2. Preparation by the teacher is necessary	Very definitely	80	92	1.892
3. Contents of the simulation game	Interesting	100	92	0.230
4. Student involvement in the game playing	Highly involved	63	25	1.839
5. Personal rating of role playing	Well	23	50	*4.236
6. Liking of playing roles	Very much	57	50	0.002
7. Perceived role playing by others	Well	47	33	0.169
8. Perceived learning	Well	43	50	0.541

TABLE V

Page 2

Questions	Response	Grade 9 N = 30 %	Grade 10 N = 12 %	X^2
9. Perceived use of simulation games for teaching	Very definitely	90	75	0.588
10. Would replay "Negotiation"	Very definitely	73	58	0.337
11. Length of introduction	Remain as is or be shorter	43	25	0.568
12. Difficulty of simulation game	Very difficult to manageable	77	83	2.413
13. Frequency of the use of simulation games	Should be used more often	90	75	0.588
14. Perceived change of opinion as a result of playing the simulation game	Very definitely	37	33	0.023
15. Data-Bank information	Complete	33	8	1.629
16. Choice of learning method	Simulation game	73	75	0.249

NOTE: X^2 = 3.84 for significant difference * Significant difference

to the simulation game "Negotiation". However, the responses of both grade nine and ten students appeared to indicate that the contents of "Negotiation" were interesting and that similar simulation games could possibly be used more frequently in the classroom. Furthermore, the responses to the questionnaire seemingly suggested that if the grade nine and ten students had a choice of method of learning a concept, a simulation game probably would be selected more often than a film or study in the library. The questions in the study which yielded significant results are presented in table form in appendix G.

Summary

The measured reactions of male and female students in grade nine indicated that the female students appeared to like playing roles better, and gave more positive indications of wanting to replay the simulation game "Negotiation" than did the male students. However, the measured reactions of male and female students in grade ten indicated very little differences concerning role playing and the replaying of the simulation game "Negotiation".

The students of both grade nine and grade ten gave indications which suggested that the higher intellectual groups found the simulation game "Negotiation" more interesting and liked role playing more than the lower intellectual groups.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

Summary

The major task of this study was to develop and evaluate a simulation game. The study attempted to determine if differences in reactions to the simulation game "Negotiation" occurred in the categories of sex, grade level and intellectual quotient.

These reactions were measured by an instrument in the form of a questionnaire comprised of sixteen multiple-choice and four open-ended questions. All categories of the item were validated by professional judgment to ensure a suitable instrument. The questionnaire assessed the reactions of students pertaining to such factors as liking of simulation games, perception of role playing, involvement in role playing, and choice of learning method. A second instrument, the Otis-Lennon test determined the intellectual quotients of students. Samples in the study consisted of forty-two grade nine and ten students who were selected from two high schools. The Otis-Lennon test was administered prior to participation in the simulation game. After the students participated in the simulation game "Negotiation", they completed the questionnaire.

Data from the study were analysed using Chi Square for Correction of Continuity and the Fisher Exact Test. The level of significance was .05.

The following descriptive hypotheses were tested in the study:

1. Is there a difference between the reactions of grade nine high school students to the simulation game "Negotiation" according to sex differences?

2. Is there a difference between the reactions of grade nine high school students to the simulation game "Negotiation" according to intellectual quotient?

3. Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to sex differences?

4. Is there a difference between the reactions of grade ten high school students to the simulation game "Negotiation" according to intellectual quotient?

5. Is there a difference between the reactions of high school students to the simulation game "Negotiation" according to grade level?

In addition to statistical testing of the five descriptive hypotheses, a descriptive analysis of the meaning of the scores was also presented. Students' responses were analysed in relation to factors of sex, IQ. and grade level.

Conclusions

The conclusions presented in the following section are based on the data analysis and results from Chapter IV. Responses on the questionnaire for the simulation game "Negotiation" involved descriptive hypothesis testing for group differences in category percentages and also by related aspects pertaining to what the percentages for different categories actually tell us about students' reactions to simulation games.

Hypothesis One

Chi square analysis revealed no significant differences between the groups on the majority of variables. This indicated close agreement

among male and female students in grade nine concerning simulation games.

Hypothesis Two

Chi square analysis of students' scores indicated some differences of reactions among students having different intellectual quotients.

Hypothesis Three

Fisher Exact Test analysis of the reactions of male and female students in grade ten indicated very little differences on any of the sixteen items in the questionnaire.

Hypothesis Four

Fisher Exact Test analysis indicated differences between the higher and lower ability groups of the grade ten class.

Hypothesis Five

Chi square analysis suggested that the grade nine students gave more positive reactions than the grade ten students concerening the simulation game "Negotiation". However, little differences on the majority of categories suggest close agreement among the males and females of both classes. Furthermore, the results of the responses to item 16 of the questionnaire by both classes indicated a positive attitude towards simulation games.

Discussion

McKenney and Dill (1968) concluded that satisfaction with simulation games was higher with the above average group than the below average group. The study by the writer appeared to support these findings because the higher intellectual groups of grades nine and ten students gave indications of finding the simulation game

"Negotiation" more interesting, and indicated greater involvement in playing the game than did the lower intellectual group. This study was not designed to ascertain why the interest level may be different for students having different intellectual levels. However, it is speculated that since most simulation games usually require mostly verbal communication of ideas, the lower intellectual groups may not feel as competent about expressing their ideas as do the higher intellectual groups. As a result they may not show as much measured interest or become as involved..

Boone (1972) observed that females after participating in a simulation game assigned higher valuations to the game's concept statements than did the males who participated in the same game. This study also appeared to indicate that female students were more interested and more involved in the simulation game "Negotiation" than the male students. However, the majority of students in grades nine and ten appeared to find the the game interesting to such an extent that if presented with a choice of learning, a simulation game would probably be selected more often than a film or study in the library concerning identical learning materials.

Comparisons of grade nine and ten students suggested that grade nine students reacted more positively to the simulation game "Negotiation" than the grade ten students. However, a possible reason for this apparent difference could have been that the grade nine students, who had participated in other simulation games , may have felt more competent in handling the game's materials.

Implications

Evidence from this and other studies suggest that simulation games can be an asset to curriculum, especially in the area of social studies. However, before simulation games can be employed effectively in the classroom teachers will have to be adequately prepared through inservice workshops or university courses. Both teachers and students must be prepared for playing simulation games because inadequate preparation will result in confusion and frustration for all participants.

Furthermore, since studies have indicated the importance of heterogeneous grouping in simulation games, it appears that if teachers are to involve students in games, homogeneous grouping which is prevalent in many schools will have to be disrupted for periods of time.

Finally, there is reason to believe that students benefit greatly by developing their own simulation game or games under the supervision of a teacher. This means that students will have to be given time and extra help to develop their own game or games. There appears to be many advantages for teachers and students in using simulation games, but can teachers make these sacrifices and meet the demands?

Recommendations

The following recommendations can be made for further study with simulation games. They are:

1. Replication of this study to determine if sex, IQ. and grade level affect the reactions of students concerning simulation

games.

2. Replication of the study with other grade levels to determine if the game could be played successfully by students below grade nine.

3. Study to measure cognitive effects of students resulting from participation in the simulation game "Negotiation".

4. Study the effects upon changing student attitudes resulting from participation in the simulation game "Negotiation".

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APPENDICES

Appendix A

Game's Questionnaire

Simulation Game "Negotiation"

- Questionaire -

Instructions: It is important that the student answer each question carefully. Check (✓) either A, B, or C. Write your name, country and role in the space provided.

Student's Name _____

Country was _____

Role was _____

1. How well did the introduction given by your teacher and/or instructor prepare you for playing the simulation game "Negotiation"?

   (a) Excellent .....( )
   (b) Fairly well .....( )
   (c) Poor .....( )

2. Do you consider that the preparation given by your teacher and/or instructor was necessary to play the game?

   (a) Very definitely .....( )
   (b) To some extent .....( )
   (c) Not certain .....( )

3. You would rate the contents of the simulation game as

   (a) Interesting .....( )
   (b) Uninteresting .....( )
   (c) Boring .....( )

4. In your opinion the members in your country group during the playing of the game were

   (a) Highly involved .....( )
   (b) Partially involved .....( )
   (c) Not involved at all .....( )

5. To what degree did you play the role to which you were assigned?

   (a) Well .....( )
   (b) Fairly well .....( )
   (c) Poorly .....( )

6. How well did you like playing roles?

   (a) I liked playing roles very much .....( )
   (b) I liked playing roles some .....( )
   (c) I did not like playing roles at all .....( )

7. From the discussions that went on in your country group, each student, in your opinion, played his/her role

   (a) Well .....( )
   (b) Fairly well .....( )
   (c) Poorly .....( )

8. How well did you learn about negotiation for an economic zone by playing the simulation game?

   (a) Well .....( )
   (b) Fairly well .....( )
   (c) Poorly .....( )

9. Do you believe that simulation games can be used to teach students about world problems as well as ordinary classroom teaching?

   (a) Very definitely .....( )
   (b) To some extent .....( )
   (c) Definitely not .....( )

10. Would you like to play the simulation game "Negotiation" again?

   (a) Very definitely .....( )
   (b) Maybe .....( )
   (c) No .....( )

11. In your opinion the introduction given by your teacher and/or instructor should

(a) Be longer .....( )
(b) Be shorter .....( )
(c) Remain as is .....( )

12. How do you rate the difficulty of the game for your grade level?

(a) Very difficult .....( )
(b) Difficult but manageable .....( )
(c) Easy .....( )

13. In your opinion simulation games as a method of teaching should be

(a) Used more often .....( )
(b) Used sparingly .....( )
(c) Never used at all .....( )

14. Did the playing of the simulation game "Negotiation" change your opinion regarding the views of other countries?

(a) Very definitely .....( )
(b) To some extent .....( )
(c) No change at all .....( )

15. In your opinion the information contained in the Data-Bank

(a) Is complete .....( )
(b) Needs more information in certain areas .....( )
(c) Needs more information in all areas .....( )

16. If you had a choice for learning about a particular social problem, the learning situation you would choose would be

(a) A simulation game .....( )
(b) Study in the library .....( )
(c) Viewing a film .....( )

The following questions are essay type questions. Take as much space as necessary and answer each question by stating your opinions openly.

1. How would you improve the game "Negotiation"?
2. The role I liked best was _____. Why?
3. What information do you consider of most importance to the game? Why?
4. What information, if any, do you think was of little value to the game? Why?

Appendix B

I) Mini-City Questionnaire

2) Decision-Maker's Chechsheet

3) Statement of Goals and Strategies

SIMULATION GAME - "MINI - CITY"

1. How well were you prepared by your teacher to play the simulation game "Mini - City?"
   (a) very well ..... ( )
   (b) fairly well ..... ( )
   (c) well ..... ( )
   (d) not so well ..... ( )
   (e) no preparation ..... ( )

2. Do you feel that preparation by your teacher was necessary to play the game?
   (a) very definitely ..... ( )
   (b) yes ..... ( )
   (c) to some extent ..... ( )
   (d) not certain ..... ( )
   (e) not necessary ..... ( )

3. How clear were the written instructions for the playing of the game?
   (a) very clearly stated ..... ( )
   (b) could be improved ..... ( )
   (c) difficult to understand ..... ( )

4. What was your reaction to the game contents?
   (a) very interesting ..... ( )
   (b) favourable ..... ( )
   (c) no readtion ..... ( )
   (d) confusing ..... ( )
   (e) bored ..... ( )

5. Was your game played over
   (a) one period ..... ( )
   (b) two periods ..... ( )
   (c) three periods ..... ( )
   (d) more than three periods ..... ( )

6. In your opinion do you think the game should have been played over
   (a) one period ..... ( )
   (b) two periods ..... ( )
   (c) three periods ..... ( )
   (d) more than three periods ..... ( )

7. In the playing of the game were you given a prescribed role to play?
   (a) yes ..... ( )
   (b) no ..... ( )
   If yes answer question 8

8. Did you like playing roles in the game?
   (a) very definitely ..... ( )
   (b) yes ..... ( )
   (c) to some extent ..... ( )
   (d) not certain ..... ( )
   (e) preferred to play without the roles ..... ( )

9. To what degree (extent) were the members of your Council involved in the playing of the game?
   (a) highly involved ..... ( )
   (b) involved ..... ( )
   (c) partially involved ..... ( )
   (d) not involved ..... ( )
   (e) bored ..... ( )

10. (teachers only) Was the Data Bank cross reference index complete enough?
   (a) very definitely ..... ( )
   (b) yes ..... ( )
   (c) to some extent ..... ( )
   (d) not certain ..... ( )
   (e) inadequate ..... ( )

11. Did Data Bank Information increase your awareness of the problem situation presented to council?
   (a) very definitely ..... ( )
   (b) yes ..... ( )
   (c) to some extent ..... ( )
   (d) not certain ..... ( )
   (e) no ..... ( )

12. Did the game give you an increased awareness of the operation of civic government?
   (a) very definitely ..... ( )
   (b) yes ..... ( )
   (c) to some extent ..... ( )
   (d) not certain ..... ( )
   (e) no ..... ( )

13. Did the game assist you in understanding the nature of the problem-solving decision making process?
    (a) very definitely ..... ( )
    (b) yes ..... ( )
    (c) to some extent ..... ( )
    (d) not certain ..... ( )
    (e) no ..... ( )

14. Did you like the idea of defending your council's decision in front of your classmates?
    (a) very definitely ..... ( )
    (b) yes ..... ( )
    (c) to some extent ..... ( )
    (d) not certain ..... ( )
    (e) no ..... ( )

15. Did your teacher analyse the playing of the game with you? (Debriefing process)
    (a) yes ..... ( )
    (b) no ..... ( )

16. Did the debriefing process help you understand the problem-solving decision making model?
    (a) very definitely ..... ( )
    (b) yes ..... ( )
    (c) to some extent ..... ( )
    (d) not certain ..... ( )
    (e) no ..... ( )

17. Do you feel that the debriefing process (analyse of the game) was an essential part of the game?
    (a) very definitely ..... ( )
    (b) yes ..... ( )
    (c) to some extent ..... ( )
    (d) not certain ..... ( )
    (e) no ..... ( )

18. List by number 1 to 8 from most important to least important aspects of the game
    ( ) Role playing
    ( ) Defence in front of peers
    ( ) Problem-solving decision-making process
    ( ) Civic government concepts
    ( ) Gathering data to solve problems
    ( ) Phrasing questions to obtain information
    ( ) Listening to mother's point of view
    ( ) Interpreting information gathered

19. What was your reaction to the Mini - City as a simulation game?
    (a) very favourable ..... ( )
    (b) favourable ..... ( )
    (c) acceptable ..... ( )
    (d) uncertain ..... ( )
    (e) unacceptable ..... ( )
    (f) boring ..... ( )

20. To improve the Mini - City Simulation Game, I would suggest .....

NATION _____

DECISION CHOICE _____

MINISTER _____

The following action has been proposed by my country. _____

_____

_____

_____

What will be the effect of this proposed action on the nations involved?	Yes	No	If in doubt, turn to page
1. MY OWN NATION: Will this action really help my nation attain its goals?	☐	☐	20
2. OTHER NATIONS: Will this Decision Choice work out well, considering what other nations' goals might be?	☐	☐	20
Checkpoints: Is this action advisable in the light of:			
3. RESOURCES AND SUPPORT: Does my country have sufficient resources to carry out this action?	☐	☐	21
4. ECONOMICS: Is this Decision Choice suitable to the economic situations of my nation and its allies?	☐	☐	21
5. INTERNAL POLITICAL SUPPORT: Will the politicians and the people of my country support this action?	☐	☐	22
6. MILITARY RISKS: Will this action create dangerous military risks for my country or for its allies?	☐	☐	22
7. WORLD PEACE: Will this action seriously endanger future international coöperation or the welfare of the human race?	☐	☐	22
8. THE HUMAN FACTOR: Is this Decision Choice realistic, considering what I know about feelings, fears, and attitudes of other countries and their leaders?	☐	☐	23
9. RIGHT AND WRONG: Is this action immoral in terms of the deepest beliefs of my country?	☐	☐	23
A final Judgment:			
10. COSTS: Do the benefits of this action outweigh its risks and costs?	☐	☐	24
TIMING: Must this action be taken at this time?	☐	☐	24

I recommend that this action be [accepted] [rejected]. Cross out the word you do not wish to use.

(Signed) _____

Nation _____ Period _____

National officials participating in the preparation of this statement:

_____ _____

_____ _____

_____ _____

List the long-range foreign policy goals of your nation in the order of their importance:

1.

2.

3.

4.

State your strategy or policy for achieving the first goal.

State your strategy or policy for achieving the second goal.

State your strategy or policy for achieving the third goal.

State your strategy or policy for achieving the fourth goal.

What are the most important obstacles preventing the achievement of these national goals?

Completed by _____ **(decision maker) at** _____ **(time)**

Submit one copy of this form to the simulation director and make one copy for your nation's files.

Appendix C

Fishing Statistics of ICNAF countries

NOMINAL CATCHES OF ALL SPECIES IN THE NORTHWEST ATLANTIC

1959 - 1973

THOUSAND METRIC TONS ROUND FRESH

	1959	1961	1963	1965	1967	1969	1971	1973
Cod	954	1304	1338	1462	1685	1494	1056	808
Haddock	129	180	126	249	117	72	49	26
Redfish	389	226	190	231	218	230	274	313
Silver Hake	53	43	277	394	127	145	237	435
Red Hake	2	3	9	101	62	56	42	68
Pollock	28	41	39	38	24	26	28	44
Flounders	77	94	128	209	272	313	301	284
O. Groundfish	130	71	168	145	102	108	168	118
Herring	154	179	285	265	594	967	747	485
Mackerel	6	6	9	16	34	130	373	420
O. Pelagics	32	19	313	245	136	130	257	359
Argentine	...	...	12	15	7	8	15	4
Caplin	7	5	6	7	8	4	6	273
O. Fish	15	20	50	69	79	174	167	135
Squids	4	10	4	10	10	10	31	67
O. Invertebrates	164	200	521	496	523	549	595	613
Stat. Area 0[5]						4	6	3
Subarea 1	275	417	478	404	465	236	150	104
Subarea 2	115	298	223	377	329	490	246	159
Subarea 3	769	696	611	748	1103	1000	954	996
Subarea 4	526	501	755	779	723	1050	1064	1139
Subarea 5	459	489	716	891	732	943	866	1063
Stat. Area 6[6]			692	753	646	693	1060	988
Total	2144	2401	3475	3952	3998	4416	4346	4452

Source: ICNAF Redbook 1974

FISHING VESSELS BY TYPE AND COUNTRY

	1959		1965		1971	
	No.	Tonnage	No.	Tonnage	No.	Tonnage
Otter Trawl (Side)	719	409,537	1316	901,551	875	315,452
Otter Trawl (Stern)	...	...	...	...	493	1,008,746
Pair Trawl	78	18,206	94	31,867	137	65,732
Danish Seine	5	272	19	1,081	28	1,699
Purse Seine	-	-	9	1,403	146	38,405
Dory Vessel	55	43,648	40	31,833	17	13,103
Longline	180	26,580	179	35,124	85	18,525
Gillnets	-	-	1	51	60	16,425
Dredges	109	9,727	116	15,777	166	21,961
Others	-	-	5	745	33	5,804
TOTAL	1146	507,970	1779	1,019,432	2040	1,505,852
Canada	211	26,742	410	64,729	534	115,752
Denmark	69	15,894	67	22,965	62	22,599
France	37	45,388	32	41,766	32	45,248
Germany (FR)	81	53,083	80	82,579	45	67,875
Iceland	41	27,191	13	10,119	1	982
Italy	2	3,299	-	-	-	-
Japan	-	-	-	-	17	37,305
Norway	54	13,432	53	16,169	42	14,020

Poland	3	2,037	19	45,624	100	156,947
Portugal	72	71,696	67	72,251	58	76,323
Romania	-	-	2	7,262	7	18,375
Spain	111	60,441	118	64,007	161	91,669
USSR	111	126,596	531	497,412	502	782,223
UK	31	25,635	61	57,386	16	17,852
USA	321	34,998	326	37,163	463	58,682
Belgium	2	1,538	-	-	-	-

Source: ICNAF list of Fishing Vessels, 1971. Issued from the Headquarters of the Commission, Dartmouth, Nova Scotia, Canada.

A major effect of the cod fishery in recent years in Divisions 2J + 3KL has been the reduction of the proportion of larger and older fish present in the stock. The number of mature fish present has declined substantially (Garrod, 1974, p. 81).

In Subarea 2 cod declined further from 163,500 tons in 1972 to 59,100 tons in 1973. (Ice conditions were a major factor for the decline). Catches of redfish increased; flounder remained about the same; roundnose grenadier increased; and catches of caplin increased from 17,800 tons in 1972 to 59,800 tons in 1973 (Garrod, 1974, p. 79).

In Subarea 3 the statistics for 19-3 indicate that the total groundfish catch was about ten percent below the 1972 level. The cod catch decreased by twelve percent from 1972 - 1973. Herring and haddock catches also declined while flounder remained about the same (Garrod, 1974, p. 84).

Preliminary statistics indicate that total catches from Subarea 4 increased in 1973 to 1.1 million tons from 0.9 million tons in 1972. Redfish, silver hake, pollock, and mackerel increased while herring and cod continued to decline. Catches of flounder and haddock remained the same (Garrod, 1974, p. 87).

For Subarea 5 the total nominal catch of all species, including shellfish increased from 939,000 tons in 1972 to 1,063,000 tons in 1973. Several species which showed an increase in catches from 1971 to 1972 continued to show increasing catches from 1972 to 1973, notably silver hake (107,000 - 120,000 tons), mackerel (201,000 - 315,000 tons)

menhaden (9,000 - 31,000 tons), squid (26,000 - 36,000 tons), and cod (32,000 tons in 1972 to 34,700 tons in 1973). The fish species that showed decline were redfish 19,100 in 1972 to 17,300 tons in 1973; haddock 6,700 tons in 1972 to 5,900 tons in 1973; argentine 32,200 tons in 1972 to 2,500 tons in 1973; and sharks and dogfish declined from 12,800 tons in 1972 to 18 tons in 1973. Both haddock and yellowtail were restricted in 1972 and 1973 by imposed total allowable catch levels (Garrod, 1974, p.94).

Source: ICNAF Redbook 1974

NOMINAL CATCHES OF ALL SPECIES IN THE NORTHWEST ATLANTIC

1959 - 1973

THOUSAND METRIC TONS ROUND FRESH

	1959	1961	1963	1965	1967	1969	1971	1973
Bulgaria						6	45	37
Canada	707	655	811	862	1041	1202	1105	885
Denmark	79	104	125	121	124	78	73	71
France	138	180	123	140	159	113	56	42
F.R. Germany	85	174	200	181	217	253	134	95
Germany D.R.	9	...	...	93	140	187	142	185
Iceland	83	24	12	9	3	14	...	...
Italy	5	4	...	...	...	...	...	4
Japan	...	...	...	...	...	20	42	41
Norway	32	49	43	44	59	54	35	71
Poland	...	4	23	57	120	180	270	255
Portugal	160	197	231	197	237	182	153	135
Romania	...	...	...	...	2	4	12	11
Spain	143	208	225	234	290	294	269	181
USSR	182	341	499	886	623	987	1022	1357
UK	18	20	42	56	81	6	8	8
USA	501	441	1149	1069	900	835	979	1074

Source: ICNAF Redbook 1974

NOMINAL CATCHES OF ALL SPECIES IN THE NORTHWEST ATLANTIC

1959 - 1973

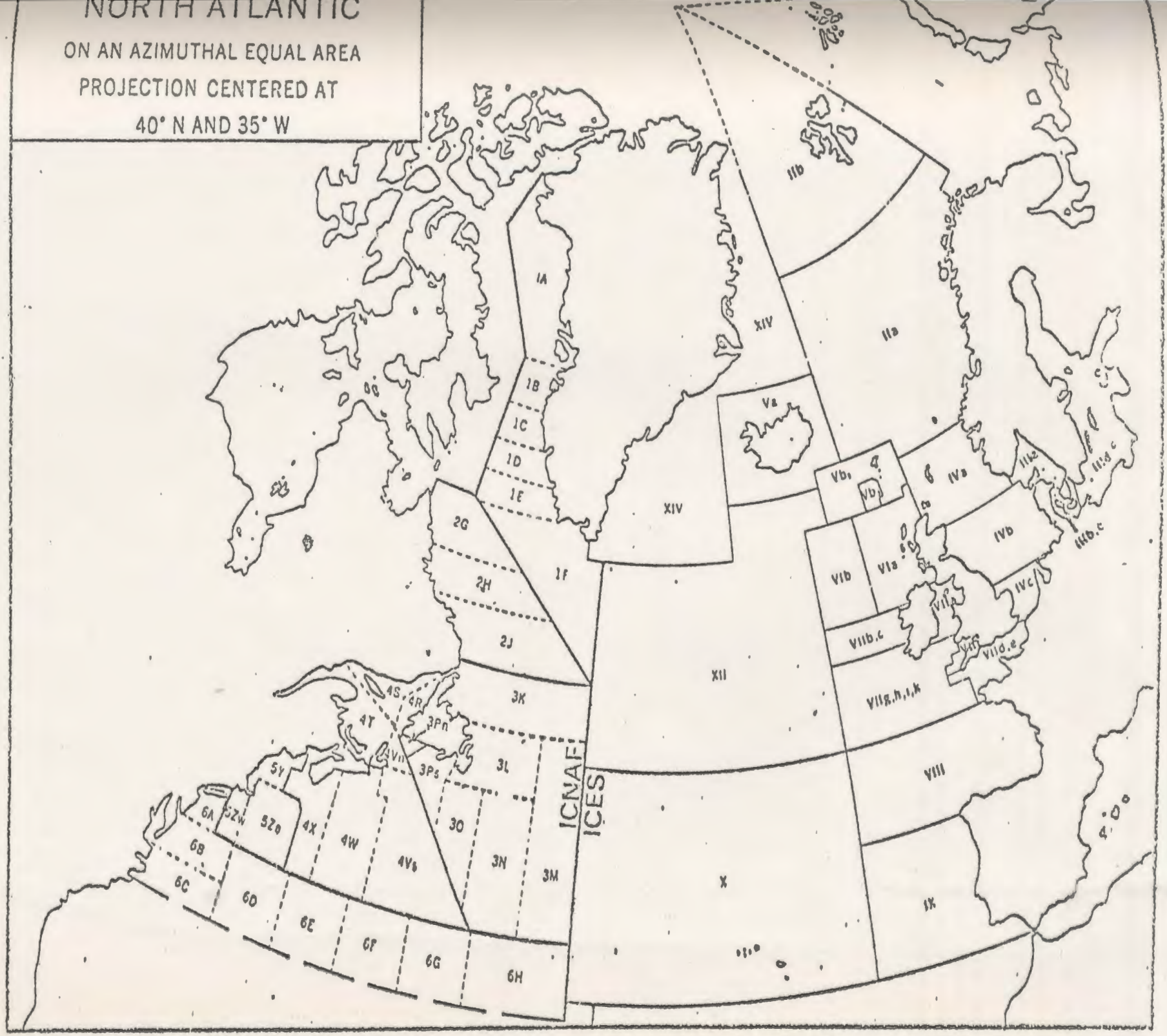
THOUSAND METRIC TONS ROUND FRESH

	1959	1961	1963	1965	1967	1969	1971	1973
Cod	954	1304	1338	1462	1685	1494	1056	808
Haddock	129	180	126	249	117	72	49	26
Redfish	389	226	190	231	218	230	274	313
Silver Hake	53	43	277	394	127	145	237	435
Red Hake	2	3	9	101	62	56	42	68
Pollock	28	41	39	38	24	26	28	44
Flounders	77	94	128	209	272	313	301	284
O. Groundfish	130	71	168	145	102	108	168	118
Herring	154	179	285	265	594	967	747	485
Mackerel	6	6	9	16	34	130	373	420
O. Pelagics	32	19	313	245	136	130	257	359
Argentine	...	...	12	15	7	8	15	4
Caplin	7	5	6	7	8	4	6	273
O. Fish	15	20	50	69	79	174	167	135
Squids	4	10	4	10	10	10	31	67
O. Invertebrates	164	200	521	496	523	549	595	613
Stat. Area 0[5]						4	6	3
Subarea 1	275	417	478	404	465	236	150	104
Subarea 2	115	298	223	377	329	490	246	159
Subarea 3	769	696	611	748	1103	1000	954	996
Subarea 4	526	501	755	779	723	1050	1064	1139
Subarea 5	459	489	716	891	732	943	866	1063
Stat. Area 6[6]			692	753	646	693	1060	988
Total	2144	2401	3475	3952	3998	4416	4346	4452

Source: ICNAF Redbook 1974

Appendix D

Map of ICNAF fishing zones


NORTH ATLANTIC
ON AN AZIMUTHAL EQUAL AREA
PROJECTION CENTERED AT
40° N AND 35° W
ICNAF
ICES
I A
I B
I C
I D
I E
I F
2G
2H
2J
3K
3L
3M
3N
3O
3Pn
3Ps
4R
4S
4T
4V
4W
4X
5Y
5Zw
5Ze
6A
6B
6C
6D
6E
6F
6G
6H
XII
XIV
Va
Vb1
Vb2
VIa
VIb
VIIa
VIIb,c
VIIg,h,j,k
VIIe,f
VIId,e
VIII
IX
X
IIa
IIb
IIc
IIIa
IIIb,c
IVa
IVb
IVc

Appendix E

Participating Schools in the Study

The students who participated in the study were as follows: Class "A" was a grade nine class at the Integrated High School in Stephenville, Newfoundland; and Class "B" was a grade ten class at L.S. Eddy Memorial Collegiate in Stephenville, Newfoundland.

Appendix F

TEACHER'S MANUAL

for

THE SIMULATION GAME "NEGOTIATION"

TABLE OF CONTENTS

Introduction

What is a simulation? A simulation involves participants in a game-like situation which uses as its focus a particular problem such as politics or international relations. Probably the earliest form of simulations existed in the seventeenth and eighteenth centuries when military men used the game of chess to plan their battle strategies. These military men replaced the chess board with physical features such as rivers, valleys, and strategic mountain passes, and instead of using the chess characters armies, guns, and other military devices decided the outcome of the game. By playing these types of war games military men could almost decide the outcome of the battles before they were fought. Furthermore battle strategy could be planned which would yield the best results under certain conditions.

Simulation games cause participants to react to the situations and to interact with each other. However, simulation games are different from games such as Monopoly where the emphasis is placed on winning. Simulation games may never have a winner although usually some recognition is given to this aspect. Instead co-operation among the players is stressed so that solutions to the problems outlined in the game will be presented as a group.

The simulation game "Negotiation"

The simulation game "Negotiation" consists of seven countries

whose delegates are meeting in an International Sea Resources Council meeting to try and reach agreement on the problem of a 200-mile exclusive economic zone for Opikland. The other six countries, Southland, Translandia Sarda, Balac, New Zeta and Ara are major fishing countries and are members of the International Sea Resources Council (ISRC). Since the granting of such a zone would involve many issues it is unlikely that an agreement will be reached at this round of negotiations.

The proposal of Opikland states: Since the continental shelf is a continuation of the landed area of a country, the country adjacent to that shelf should have control over both the marine and other resources connected with the shelf area. Opikland, however would be satisfied to have control over a zone only reaching 200 miles from the established base-line. In a real situation the delegates would have the information that would be necessary in making a decision or at least to start negotiating. The game's participants at the beginning of the game do not have this information so they must acquire it. This is the purpose of the Data-Banks. A Data-Bank is provided for each of the seven countries and each contains the same information. As the participants obtain information contained in the Data-Bank, negotiation will be able to occur among the different countries. When the negotiations have been completed, Control will ask each country to write a fairly detailed proposal with supporting evidence as to accept or reject the proposal which was read by Control. The proposals will be collected by Control so that they can be duplicated for each of the countries

to be studied and voted on by individual delegates. The country obtaining the most votes will be declared the winner.

The Situation

The situation is hypothetical and the participants must use their imagination and project themselves years into the future.

The countries of the world have been meeting for several years trying to find a workable solution to problems concerning continental shelves such as 200-mile fishing zones and management of marine resources. Up to the present time no solutions have been acceptable. To complicate matters, many experts believe continental shelves contain, besides the marine resources of the different species of fish and mammals, the last resources of petroleum and other minerals. It is extremely important, then, that decisions that are made in reaching of agreements be well thought out because the consequences are inevitable. However, some countries are getting impatient and it looks like some sort of solution will have to be arrived at before long.

Ten years ago in 1981, the major countries involved in fishing off the coast of Opikland formed an organization "The International Sea Resources Council" (ISRC). The main objective of the ISRC was to control fishing on the continental shelf off Opikland and northern Southland. The ISRC divided the continental shelf of Opikland into zones so that the fish taken by each country could be monitored (see map). Each country has been obligated to forward each year fishing statistics to the ISRC headquarters. In addition, scientific research carried out in the different

zones concerning the habits of fish, water temperature, ocean currents and other phenomenon related to fishing since 1981 has been documented at the ISRC headquarters.

With the aid of these scientific findings, the yearly quotas for the different species of fish have been set by the ISRC. However, some countries have exceeded their quotas and have not been penalized. Also, there appears to be evidence that fish stocks are declining each year and certain countries are greatly concerned about it. Opikland, in particular, is not happy with the situation. Fish experts in Opikland have been claiming for a number of years that fish quotas set by the ISRC quota committee have been too high for each country. These same experts insist that fishing statistics indicate that fish stocks are declining. At the request of Opikland and agreed to by the other countries of the ISRC, it was decided that a special council meeting be held to try and resolve the matter.

Orientation of Students

Before playing the simulation game "Negotiation" the teacher should spend a certain amount of time discussing the fishing industry and the Law of the Sea Conferences. However, if the class has just completed a unit on the fishing industry, it would probably be ready for playing the game. The teacher should also explain the concept of negotiation and spend some time with the class discussing role-playing. In addition, some students may have a little difficulty with the terms contained in materials for each country, and need help from the teacher.

THE PHYSICAL SETTING FOR NEGOTIATION

Playing "Negotiation"

"Negotiation" requires that the class be divided into seven groups having four participants in each group. The seven countries are Sarda, Balac, Ara, New Zeta, Southland, Translandia and Opikland. The four roles for each country are Chief Negotiator, Economic Minister, Minister of Fisheries, and Scientific Advisor. If the class is unable to accommodate seven groups of four students, one role from each country could be eliminated and have seven groups containing three students in each. Although this would limit the game, it could be done to overcome the problem.

After the class has been divided into seven evenly matched groups, distribute the materials to each country group. After each group has examined the materials for a few minutes check the materials against the list below to ensure that each country has all of the required information. Each country group should have the following: (i) A role for Chief Negotiator, (ii) A map of the world showing how the oceans would appear if each country claimed a 200-mile zone, (iii) A list of terms pertaining to the economic zone, (iv) Fishing vessels and tonnage of these vessels for each country, (v) A diagram of the continental shelf, (vi) A fishing report, and (vii) Maps showing the location of each countr The teacher should ensure that the oceanographic maps are interpreted correctly because they are extremely important in playing the simulation game.

Students will need around fifteen minutes to look over the materials and assign the different roles. The teacher should obtain a list

of students and the role of each for all countries. The above would take a period to complete so that the actual playing of the game would begin the next period.

During the second period when requests for information start to come in have the students bring the requests to Control with the name of the country written on the request. Students should not wait around Control for the information but return to their respective countries and when Control has located the information then a representative of the country could return to Control and obtain that particular information. If Control has access to additional students who would act as messengers during the game, the work load would be reduced considerably and the game would be run more efficiently. After twenty-five minutes of the first playing period, the Scientific Advisors should meet for a round of negotiation for a period of five minutes. Unless the game is being played in a two-period block no more negotiations should be permitted.

During the second playing period the Ministers of Fisheries and the Economic Ministers should be permitted to engage in negotiations having at least ten minutes between each round.

After playing ten minutes of the third playing period advise the Chief Negotiators that they can meet for ten minutes. No other negotiations should occur in the third playing period unless there is a special request from at least three countries who desire to have negotiations. During the last ten minutes of the third playing period ask the Chief Negotiator for each country to give a policy statement regarding negotiation

conducted up to the present. This statement should be limited to two minutes.

By the fourth playing period countries should have obtained most of the information from the Data-Banks. Inform the Chief Negotiators at the beginning of the fourth playing period that they will be permitted one round of negotiation at the ten minute mark. This round of negotiations will be different because they will only involve two negotiators at any one time which will enable private sessions between any two countries. Each Chief Negotiator should meet the other three in a private session. After this round of negotiation the countries are to start preparing their proposals. All proposals should be finished by the end of the fourth playing period so that Control can collect them for duplication.

During the fifth playing period all of the proposals should be distributed to the different countries for analysing. Allow time for the proposals to be read, then decide by secret ballot by having each delegate vote as to which country presented the best proposal. After the balloting have ten minutes for open discussion. Control should take the last ten minutes for post-game analysis.

Translandia

Translandia is the largest country in the International Sea Resources Council and has a population of 300 million people. Translandia fishes its own continental shelf but about eighty percent of the fish is caught two to five thousand miles away from home with fifty percent of the fish being caught on the continental shelf off Opikland.

Translandia has the largest oceanographic research fleet in the world and also is the third largest fishing nation in the world. Translandia is the largest fishing nation in the ISRC and is probably the best nation equipped for fishing. Since Translandia is a great military power, it is concerned about any country controlling large areas of the ocean. It is particularly concerned about the passage of ships through straits.

Translandia has put large amounts of capital into the fishing industry and would like to catch as much fish as possible. Translandia exports less than five percent of the fish it catches.

Economic Minister for Translandia

You are 35 years of age and a possible choice for the next president of your country.

Your government has just started a new five year plan for mining, farming, industrial development, etc. This plan is now in operation and it will be difficult to change it. If fish protein is not supplied as planned by the fishing industry it will mean greater demand of farming or greater

importation of food.

Your aim at this ISRC is to try and protect your country's interest in the fisheries. If Opikland does acquire an economic fishing zone, will licences be required to fish in the zone?

Minister of Fisheries for Translandia

You are 45 years old and a prospect for an ambassador's post to a large country. You would like very much to get this job. When you accepted the post of Minister of Fisheries five years ago, the fishing industry was in a healthy condition. You have promoted further expansion of the fishing fleet which would in fact have to be reduced if fishing quotas on the continental shelf area off Opikland are reduced. It would be political suicide for you to agree to an economic control zone unless the fishing quotas would have only a slight reduction.

Also you are concerned about the closing of straits and what measures concerning pollution would be enforced by Opikland.

Scientific Advisor for Translandia

You are 30 years of age and you are considered an expert in sea resources. You have carried on research work off the coast of Opikland for the past eight years and you believe that the fish stocks are being depleted. You will recommend a reduction in fishing on certain banks off Opikland such as Alantis Shelf, and that all countries should take the same cut in fish quotas. There is evidence as well that Opikland has not practiced good conservation methods regarding Redfish in the Inland Sea. Try to acquire this evidence.

Chief Negotiator for Translandia

You are 50 years old and have worked hard to obtain the position you now have with your government. Since your country has invested substantially in fishing vessels, fishing research and oceanographic studies you will want to maintain present fish quotas. If quotas have to be reduced you will argue that countries not in the ISRC take the quotas reductions first. You would like to know how much fish is caught in each area at the present time.

Sarda

Sarda has a population of seventeen million people and is the smallest country in the International Sea Resources Council. Sarda is the poorest country in the ISRC and depends very much on the fishing industry.

Sarda has few minerals and its agricultural land is poor so it has to import much of its farm products. Sarda has a fairly up-to-date fishing fleet, and for a poor country has invested large percentages of its budget into the fishing industry. Sarda has access to fishing areas at home but the continental shelf off Opikland is the major zone and where most of the fish is caught.

Chief Negotiator for Sarda

You are 40 years old and have been involved in politics for ten years. As chief negotiator for Sarda you will want to maintain your quota of fish which you consider essential for the welfare of your country. You will want to find out if there will be any reductions in quotas of fish if

an economic zone is introduced.

Economic Minister for Sarda

You are 55 years of age and have been a delegate to the ISRC since it was formed. As your country has few minerals you will be interested in finding out if findings of minerals in the economic zones will benefit the poorer nations.

You are also interested as to what control any state would have on an economic zone, pollution, licences, etc.

Scientific Advisor for Sarda

You are 32 years old and a qualified fishing expert. There is evidence that there are different fish stocks on the continental shelf off Opikland. You believe that these fish stocks may have been reduced but not depleted by overfishing. You are also aware that Opikland has not shown that it is conservation minded. Is Opikland more interested in oil deposits off its coast than in the fisheries? Drilling for oil could cause serious pollution. Where is Opikland drilling now?

Minister of Fisheries For Sarda

You are 35 years old and since you became Minister of Fisheries ten years ago, the amount of fish caught by your country has increased. Fishing is very important to your country and if fishing quotas were reduced, your country could face a food shortage. You would also like to know what form of control in the form of licencing of fishing ships by Opikland will take place. You are also interested in pollution control measures and the closing of certain straits.

New Zeta

New Zeta has a population of 42 million people and is considered a middle country in the International Sea Resources Council. New Zeta has a short coastline and so the continental shelf area that it could have access to is limited. New Zeta's government is completely against economic fishing zones and believes in the complete freedom of the seas. New Zeta maintains that if all countries of the world claimed 200-mile economic zones, most of the world oceans would be carved up. New Zeta's government believes that if economic control over continental shelves is given to coastal countries it could lead to monopolization of the fisheries.

Economic Minister for New Zeta

You are 36 years old and have held different government offices. Your government has progressed the country's economy so that it is at present in a healthy condition. Since your government has spent a lot of money in building new fishing trawlers, and designing fishing equipment you would like to have access to as much fishing grounds as possible. You do not believe that countries should be permitted control of what you consider open sea which should be for the benefit of all nations.

Your main interest will be finding out if fish stocks are declining. Your country is hoping to strike oil off its short coastline. What are the prospects of oil off New Zeta?

Minister of Fisheries for New Zeta

You are 34 years old and have just been elected to government in a by-election. At the present time you find yourself Minister of Fisheries

and representing your country at the ISRC Convention. Since your country does most of its fishing in waters off the coast of other countries, economic controlled fishing zones could be harmful to your country's fishing. You will be interested in finding out what fishing quotas are proposed and what effects a controlled zone will have on straits and the innocent passage of ships. Also which country will be responsible for pollution control within the zone?

Scientific Advisor for New Zeta

You are 25 years old and this is your first year of involvement in the ISRC. As a scientist you are interested in conservation of all fish stocks throughout the world. You would like to see some evidence which would support the idea that Opikland has practiced conservation of the fish stocks in the Inland Sea which it has had control over for three years. You would also like to see the fishing statistics.

Chief Negotiator for New Zeta

You are 40 years old and have fifteen years experience in international negotiations.

You are not in favor of economic zones being controlled by any nation. Your main concern at the convention is to maintain that the seas should be kept free for all nations. You believe that quotas could be set by the country controlling the economy that could be harmful to other fishing nations and that these quotas for fish may not even be necessary.

ARA

Ara has a population of 70 million people and is a leader of the

Black nations especially on the Great Dark Continent. Ara is in favor of economic zones but it also thinks that all countries in the world should benefit from the resources of the sea, including the minerals. The poorer countries of the world are far behind in the development of technology and Ara believes that the richer countries should help provide the poorer nations with machinery such as oil drilling rigs and technical advice so that the poor countries can enjoy a better standard of living. Ara will accept some type of economic zone but the type will depend on a number of factors relating to fishing and development of resources.

Ara catches about thirty percent of its fish on the continental shelf off the coast of Opikland.

Economic Minister for Ara

You are 44 years old and have been involved in political life for more than ten years. Your aim in this convention of the ISRC is to press for measures that will help your country as well as the poorer nations. If Opikland secures a vote for an economic zone of some type what form of controls will be exercised in the form of licenses needed for fishing vessels, and what will happen if a certain country cannot catch all of the fish allotted to it for a certain year?

Minister of Fisheries for Ara

You are 42 years old and have been in political for fifteen years. When you became Minister of Fisheries five years ago, your country had just started on a big ship-building program for participation in the fisheries of Opikland. Prior to that, your country had focused its

attention on the fishery off its own coast. You do not believe that countries should compete in the world market in the selling of fish because it is a food and there are far too many hungry people to have countries bargaining over who gets the best prices. You will want to find out how much control Opikland will have over pollution if an economic zone of some kind is granted.

Scientific Advisor for Ara

You are 30 years old and because of your studies you are considered an expert on world fisheries. You are interested in the past conservational practices of Opikland. You would also like to see the fishing statistics regarding other nations. You are a strong believer in the fishing rights of all nations and especially those of the poorer nations. You believe that the richer nations should make modern fishing methods available to the poorer nations.

Chief Negotiator for Ara

You are 37 years old and are considered a world expert in the field of Sea Law. Although your country is not one of the larger fishing nations of the world, you are still interested in the fish quotas that might be brought in by Opikland if an economic zone is obtained. However, you are more concerned about how the poorer world nations would benefit from economic zones if many countries had them.

Balac

Balac has a population of 40 million people and is considered a middle country in the International Sea Resources Council. Balac has a

short coastline and as a result the continental shelf area that it could possibly control is only small. Balac catches almost 100 percent of its fish on the continental shelfs off other countries. Trawlers from Balac travel more than 2000 miles to fish in distant waters. About seventy percent of its fish is caught on the continental shelf off the coast of Opikland. Balac ships are well equipped with the latest fishing equipment to exploit the fishery in almost any part of the world. An economic zone ould create a loss in fishing but it would depend on the terms.

Economic Minister for Balac

You are 50 years old and have been a delegate to the ISRC for your country since the ISRC was formed. Your country is not considered rich in minerals nor is it highly industrialized. Your government has spent ten percent of its budget for the last ten years on the fishing industry and if fishing on the continental shelf off Opikland is reduced, your country will suffer financially. You would like to see the fishing statistics to find out if other countries are over fishing certain areas.

Minister of Fisheries for Balac

You are 36 years of age and since you were appointed Minister of Fisheries eight years ago, the amount of fish caught by your country has increased substantially. Fishing is very important to your country and if fishing quotas were reduced by forty percent your country could face a food shortage. You are also interested in the types of pollution control measures that might be introduced, and if certain straits will be closed to shipping. You will also endeavor to find out if an economic zone is obtained by

Opikland, what forms of control in the form of licences for fishing trawlers will be required.

Scientific Advisor for Balac

You are 30 years old and are considered to be an expert on the location of fish stocks and the movement of these stocks. You believe that these fish stocks should not be depleted by overfishing. Evidence shows that Opikland has not practiced conservational methods and if Opikland obtains control of a 200-mile economic zone, will the fish stocks be conserved? Drilling for oil has taken place on the continental shelf off Opikland in the past year. What would happen if there were a serious oil spill? There must be controls for pollution. Try to find the answers to these questions.

Chief Negotiator for Balac

You are 34 years old and have been involved in politics for five years. As chief negotiator for Balac you will want to maintain your present quotas of fish catches. You will want to find out if an economic zone is introduced, will there be reductions in the amount of fish that will be allowed to be caught by each country or will it concern only certain countries?

Opikland

Opikland has a population of 35 million people and is the second smallest country in the International Sea Resources Council. The continental shelf off the coast of Opikland is one of the greatest fishing areas in the world.

In recent years Opikland has had an extensive ship-building plan and has built larger and better fishing ships so as to compete with other countries. However, it appears that the fish stocks have been declining because the catches of certain species of fish have declined. Opikland wants to save the fishery and it believes it can only do this by having control over the amount of fish that will be caught. Opikland is a rich country and has minerals and abundance of farmland.

In reality, fishing is only a fringe benefit. Its main concern is keeping the fish stocks from depletion.

Economic Minister for Opikland

You are 48 years old and a highly recognized economist. Opikland is granted the 200-mile economic zone or the full continental shelf, does it have sufficient patrol vessels to police the fishing areas? You believe that a phase-in period would be more appropriate because it would give Opikland time to build more patrol ships. Your country will have to determine what type of control regarding licencing of ships, etc.

Minister of Fisheries for Opikland

You are 50 years of age and have been in politics for ten years. During the last election campaign you promised that Opikland would have a 200-mile economic zone within three years. Two years have passed and your dream has not been realized. Two million people along the coast of Opikland mainland and on Gadus Island depend on the fisheries. Fishing statistics show that the certain species of fish have declined. This could be due to a lack of conservation on the part of certain countries. Review the conservation policies of Opikland.

Scientific Advisor for Opikland

You are 30 years old and a highly qualified fishing expert, especially in movement of fish stocks. There is evidence concerning different fish stocks on the shelf off Opikland. You believe that an economic zone should be established to protect these fish stocks and help provide for a more economic inshore fishery. You are particularly interested in the area of A and B because of possible pollution outbreaks in the future connected with drilling.

Chief Negotiator for Opikland

You are 28 years old. After obtaining a law degree five years ago, you became involved with ISRC and as a result have become well known in international negotiations for Opikland.

Your main concern is to get reductions in fish quotas because fish stocks are being depleted. You will have to find out if Opikland is practising good conservation. Also, if Opikland is unable to catch its quota, what will happen to the surplus of fish? Will the surplus fish be caught by other countries?

The inshore fishermen of Opikland must be given good consideration. How do they feel about a 200-mile economic zone?

Southland

Southland has a population of 250 million people and is the second largest country in the International Sea Resources Council.

Southland has a large continental shelf and about seventy percent of the fishing takes place on this shelf but other nations fish there

as well.

About ten percent of the fishing by Southland is done on the continental shelf off the coast of Opikland. The remaining twenty perce of the fishing effort takes place in waters off the coast of other count If Southland recognized that Opikland should be given control of a 200 mile limit, it would have to recognize zones of other countries as well. Also, Southland is a large military power and wants free access to as mu of the oceans of the world as possible.

Questions concerning straits would be of interest to Southlan Southland has traditional fishing rights in certain waters of Opikland.

Economic Minister for Southland

You are 38 years old and have been a member of the government since graduating with a degree in economics. An election is due in one year and you are considered a prime candidate for Prime Minister. Your arguments and showing at the Convention will affect your political standing.

Your concern will be to find out what controls regarding licen ing will be taken by Opikland if an agreement is reached with respect to economic zone.

Minister of Fisheries for Southland

You are 55 years of age and have been in political life for thirty years. If Opikland were to acquire some form of economic zone wou foreign fishing ships be required to obtain fishing licences to fish in the zone? Also, it is your concern that if Opikland is given complete

control of such a large fishing zone, it could lead to a monopolization of the fishing industry by Opikland.

Scientific Advisor for Southland

You are 25 years of age and considered an expert in fisheries resources. In your opinion, if there is sufficient evidence to prove that the fish stocks on the continental shelf off Opikland are being depleted, then certain areas should have reductions in quotas so that the stocks can replenish. You believe that more effort should be provided for fish farming and you will try to find where fish farming could take place.

Chief Negotiator for Southland

You are 43 years of age and you are considered an expert in International Relations. At present the only area fished extensively by your country which would come under the 200 mile zone proposed by Opikland is Area G. If you support a 200 mile zone for Opikland, fishermen in Southland would also demand the same. This may be desirable for certain fishermen in Southland but it would be very detrimental to Southland fishermen who fish in waters off other foreign countries. You are already having trouble with countries who have declared a 200 mile zone. Up until now your country has only recognized a three mile limit. You are interested as to what effect an economic zone would have on the passage of warships through the zone or part of it, and if minerals and their extraction would come under the control of the coastal economic control state.

DATA-BANK INFORMATION

1. Conservational practices of Opikland.
2. Why Opikland is concerned about an economic zone.
3. Conditions for catching surplus fish quotas in the economic zone.
4. Conditions for transferability of surplus fish quotas within the economic zone.
5. The Coastal State regulates the catches of fish in the economic zone.
6. Phasing out of fishing zones.
7. Fishing by foreign states in the economic zone.
8. Mineral and petroleum committee report.
9. Ice conditions of Opikland.
10. Other countries have declared a 200-mile economic zone.
11. The limits of the economic zone.
12. The continental shelf area.
13. Passage of ships through straits.
14. Exploitation of the resources on the continental shelf of another coastal state.
15. Gallup polls conducted throughout Opikland.
16. Who wants the 200-mile limit? The government or the fishermen?
17. Military strength of Opikland.
18. Oil and gas findings on the continental shelf off New Zeta.
19. World economic zones benefit the poorer countries.
20. Fish farming.
21. Economic fishing zone for Southland.

Data-Bank Information

Conservational Practices of Opikland

Opikland has not permitted any foreign countries to fish for Redfish in the Inland Sea for a number of years. However, instead of trying to conserve the stocks of Redfish and make an example for other nations, the government of Opikland has allowed overfishing to occur. Scientists in Opikland stated that Redfish stocks have declined seriously and a substantial reduction in the catching of this fish is necessary to permit the stocks to revive. However, Opikland fishermen are quick to point out that other species of fish have been overfished by foreign countries.

Why Opikland is Concerned About An Economic Zone

Opikland's fishing experts claim that the fishing statistics show that certain species and stocks of fish are declining. The experts claim that catches of fish are smaller and that Opikland would like to have an economic zone so that fish quotas could be regulated for each of the fishing areas. Maybe another reason is the political pressure by fishermen along the eastern coast. A Gallup Poll might give more information on the feelings of the fishermen.

Conditions for Catching Surplus Fish Quotas in the Economic Zone

Surplus fish quotas would be created if a country for various reasons was unable to catch all the fish allotted to it in a particular year. That particular country could then sell the remainder of its quota

to another country for a nominable fee. The finances gained could be used to build more fishing vessels or used to help the economy generally. However, the Coastal State, i.e. Opikland would have to okay the transfer, and the transfer would only be permitted under certain conditions.

Conditions for Transferability of Fishing Quotas Within the Economic Zone

Any one nation would only be permitted to acquire the fishing quota of one other State. This is to ensure that no nation would be able to gradually gain control of fishing quotas and have a monopoly on fishing, or force poorer nations out of the fishing business.

The Coastal State Regulates the Catches of Fish in the Economic Zone

The coastal state i.e. Opikland would take into account the latest scientific evidence regarding fish stocks and take proper conservation steps to ensure that fish stocks would not be overfished. However, the coastal State would endeavour to have the maximum amount of fish caught without damaging the fish stocks. Reduction in fish catches appears inevitable.

Phasing Out of Fishing Zones

If Opikland or any other coastal State obtains an economic fishing zone and decides to reduce fish catches, it must provide a phase-out period for the different nations. In addition, the coastal State must be reasonable and realistic in setting the conditions for catching fish in the economic zone by foreign countries.

Fishing by Foreign States in the Economic Zone

If Opikland acquired an economic zone by negotiation it would have the right to permit foreign countries to fish only for surplus fish - fish that Opikland was unable to catch. Fishing experts in Opikland would set the amount of fish that would be permissable to catch each year, and each country would be permitted to catch a certain percentage of the quota. Special fishery vessels would ensure that the fishing laws were obeyed.

However, other demands could be made by Opikland if it desired to do so. It could ask that all fish caught in the economic zone be landed in Opikland's ports. A fishing fee could be charged for fishing in the zone. In addition, it could determine the size of fish, and the catch per vessel. All these regulations would be stated on the fishing licence which would be issued by coastal State, e.g. Opikland.

Mineral and Petroleum Committee Report

Drilling over the years has been done in areas A, B, D, E, F, and G. Substantial finds of petroleum have been trapped in area A and B, especially in the areas of Nutak Bank, Green Bank, and Sabastian Bank. Gas has also been found in undisclosed areas off Cadus Island. The Committee is concerned about the possibility of a major oil spill and the pollution of fish spawning grounds. The Committee (which is composed of members from all ISRC countries) feels that if Opikland were granted an economic zone of 200 miles, the danger of pollution would be minimized because the fishing activity in the areas concerned would be strickly controlled by Opikland.

However, the problem of icebergs would have to be looked into.

Ice Conditions off Opikland

Drift ice and icebergs occur off the coast of Opikland each spring and early summer, especially in areas A and B. Icebergs weigh thousands of tons and if they come in contact with the ocean bottom, large trenches are made by them, which suggests that if pipelines are laid on the ocean floor in certain areas, they could be crushed by icebergs.

Certain fishing experts of ISRC countries claimed that severe ice conditions in the past years have caused a drop in water temperature which has affected the fish catches in areas A and B. They claimed that this change in water temperature has resulted in a poor inshore fishery.

Other Countries Have Declared a 200-Mile Economic Zone

Ten countries around the world have declared a 200-mile fishing zone and have endeavoured to enforce the fishing regulations in these zones. However, some of the more powerful military nations have not recognized these exclusive economic zones and have continued to fish inside the 200-mile limit. This has led to disputes between nations especially when the fishing ships are caught and fined by the controlling State.

However, if Opikland obtained a 200-mile economic zone, other nations would be permitted to fish within the zone. Opikland would only set the rules for fishing.

The Limits of the Economic Zone

According to Article 46 of the Law of the Sea Conference, 1975, the limits of the economic zone are not to extend beyond 200 nautical miles

from the baseline. The baseline can extend from headland to headland provided the distance between the headlands does not exceed 24 nautical miles.

The Continental Shelf Area

International law indicated that the continental shelf of any coastal State may extend to the outer limits of the continental margin or to a distance of 200 miles from the baseline. (See definitions and diagram).

Passage of Ships through Straits

The Law of the Sea has recognized for more than 100 years, the rights of all ships and in later years, that of aircraft to enjoy the right of passage through straits. Opikland recognizes this law and although it might close Inland Sea to all foreign ships, it would not be violating the law because ships do not have to use the Inland Sea unless they are calling at ports in the area.

Exploitation of the Resources on the Continental Shelf of Another Coastal State

If a nation wishes to explore or exploit the resources on the continental shelf of another country it first must get permission from the country concerned. If a 200 mile economic zone has not been agreed upon by the major world countries, the continental shelf area over which the country has control would not extend beyond twelve miles which is the recognized limit for all coastal States.

Gallup Polls Conducted Throughout Opikland

A gallup poll conducted recently on the eastern coast of Opikla

and Gadus Island indicated that more than ninety-five percent of the people favored a 200-mile economic zone to protect the fishing industry. However, gallup polls conducted in central and western Opikland indicated that less than fifty percent knew the purpose of establishing a 200-mile economic zone. Apparently the fishermen on the east coast are pressuring the Government for action.

Who Wants the 200-Mile Limit? The Government or the Fishermen?

On the eastern coast of Opikland there are hundreds of fishing communities, especially on Gadus Island, along the Inland Sea and in the area of the Molva Peninsula. These communities almost depend entirely on the fishing industry by working in fish processing plants, or working in shipyards which build and repair trawlers, or they may be active fishermen. If the fish stocks are depleted severely, these communities will suffer untold hardships. The Government of Opikland realizes that Opikland is a trading nation, and that the income from fish is small compared to other natural resources. The Government's aim is to seek a compromise with other fishing nations. If an economic zone is obtained, a phaseout period for foreign nations will be provided.

Military Strength of Opikland

Opikland is not a great military power and only has a fighting force of about 100,000. It has a small highly sophisticated navy and air-force which could be used to control fishing on the continental shelf. It is highly unlikely that Opikland would attempt to use force in gaining control of its fishing areas as other countries have done. Most of the countries fishing on the continental shelf off Opikland are much poorer than Opikland,

and if military force were used to prevent these countries from fishing, Opikland's prestige would be greatly affected on a world-wide basis. Also, if some of the more powerful nations insisted on fishing and brought in their own navies, Opikland could do very little about it.

Oil and Gas Findings on the Continental Shelf off New Zeta

In the past few months oil and gas findings have been made off New Zeta at a distance of twelve miles from the coast. Evidence seems to indicate that other findings may be made beyond the twelve-mile limit. Fishing experts in New Zeta believe that adequate protection regarding pollution can be gained by establishing safety zones around the oil rigs. However, delegates to the ISRC may think differently.

Would Economic Zones Benefit the Poorer Countries?

At the present time any nation can fish within the waters of another State to a distance of twelve miles from the coastline. As a result, the fish resources of poorer countries are being exploited by the more sophisticated fishing nations. If these countries had a 200-mile economic zone, this could not happen without their consent. Also technical aid for the fishery probably could be obtained from certain countries by allowing them to fish within the economic zone. Trainees could be put on board foreign ships to train them in fishing techniques. It appears that poor coastal countries could benefit from having an economic zone because its fishery could be helped and exploration and exploitation of other resources would be controlled by the coastal State.

Fish Farming

Although more scientific studies are necessary, there are

indications that fish farming could be carried out successfully in the Inland Sea. However, this would have to be a joint venture by all countries of the ISRC.

Economic Fishing Zone for Southland

Fishermen that fish in the waters adjacent to Opikland are pressuring the Southland Government for a 200-mile economic zone. However, many fishermen in other parts of Southland fish in foreign waters and do not accept fishing controls beyond twelve miles. If Southland establishes a 200-mile economic zone then recognition will have to be given to other countries who wish to do so. This would be detrimental to certain Southland fishermen unless special agreements could be worked out.

Opikland Fishing Report

Fishing accounts for about fifteen percent of the gross national product and more than seventy percent of the fish and fish products are exported. All of the fish are caught off the coast of Opikland and ninety percent of it within 200 miles.

New Zeta Fishing Report

Fishing accounts for about twenty-five percent of the gross national product. New Zeta exports around thirty percent of the fish and fish products. New Zeta catches around sixty percent of its fish on the continental shelf off Opikland.

Balac Fishing Report

Twenty-five percent of Balac's gross national product comes from fishing and exports forty percent of the fish it processes. About

sixty-five percent of Balac's fish is caught in the waters off Opikland.

Sarda Fishing Report

Sarda's fishing effort accounts for fifty percent of its gross national product. Sarda catches eighty percent of its fish on the continental shelf off Opikland and exports twenty percent of the catch to help balance its trade.

Ara Fishing Report

Fish products account for twenty-five percent of the gross national product. Ara exports twenty percent of its fish products. About thirty-five percent of the fishing by Ara takes place on the continental shelf off the coast of Opikland.

Southland Fishing Report

Southland's fishing effort accounts for ten percent of the gross national product. Southland exports fifteen percent of its processed fish. About twenty percent of Southland's fishing is conducted in the waters off Opikland.

Translandia Fishing Report

Fish products account for thirty-five percent of Translandia's gross national product. Forty percent of the fishing effort by Translandia is carried on in the waters off Opikland. Translandia exports only five percent of its processed fish.

Fishing vessels for each ISRC country fishing on the Continental Shelf off Opikland.

	Number	Tonnage
OPIKLAND	550	125,315
SOUTHLAND	485	85,675
TRANSLANDIA	520	900,215
SARDA	78	102,412
BALAC	55	91,348
NEW ZETA	43	74,285
ARA	36	66,690

1991	AREA	1992	AREA	1993
15,200	A	91,600	A	86,380
14,254	B	133,000	B	170,130
208,000	C	203,000	C	180,200
284,000	D	289,000	D	258,300
248,000	E	224,000	E	223,100
454,000	F	225,000	F	187,000
580,000	G	736,000	G	758,400
558,000	H	214,500	H	131,100
251,000	I	251,000	I	163,500
2,612.454		2,367,100		2,158,110

Above are the total catches of all species of fish for the different ISRC areas for the years 1991 and 1992. The third column shows the quotas for these same areas for 1993.

Metric tons of Fish

Fish Specie: COD

AREA	1991	1992	QUOTA FOR 1993
A	200	100	80
B	254	160	130
C	165,000	161,000	150,100
D	200,000	175,000	155,000
E	150,000	100,000	80,000
F	80,000	60,000	52,000
G	100,000	64,000	54,000
H	50,000	36,000	34,500
I	80,000	78,000	19,500
TOTALS	825,454	674,260	545,310

Fish Specie: REDFISH

AREA	1991	1992	QUOTA FOR 1993
A	5,000	22,000	19,000
B	3,000	23,000	19,000
C	30,000	28,000	22,000
D	20,000	20,000	17,000
E	33,000	30,000	20,000
F	35,000	32,000	26,000
G	27,000	34,000	30,000
H	12,000	18,000	17,000
I	50,000	100,000	100,000
TOTALS	215,000	307,000	270,000

*All figures above refer to metric tons of fish.

Fish Specie: YELLOWTAIL

AREA	1991	1992	QUOTA FOR 1993
A			
B			
C			
D	6,000	9,000	12,000
E	10,000	13,000	20,000
F			
G		2,000	
H	12,000	20,000	25,000
I			
TOTALS	28,000	44,000	57,000

*All figures above refer to metric tons of fish.

Fish Specie: GREENLAND HALIBUT

AREA	1991	1992	QUOTA FOR 1993
A	7,000	20,000	15,000
B	6,000	17,000	14,000
C			
D	12,000		14,000
E	12,000		15,000
F			
G		30,000	
H			
I			
TOTALS	37,000	67,000	58,000

*All figures above refer to metric tons of fish.

Fish Specie: AMERICAN PLAICE

AREA	1991	1992	QUOTA FOR 1993
A	1,000	3,000	2,300
B	1,000	4,000	3,100
C	4,000	1,000	500
D	25,000	25,000	15,800
E	30,000	25,000	15,600
F	22,000	20,000	22,000
G	16,000	8,000	
H	4,000	2,000	
I	2,000	1,000	
TOTALS	105,000	89,000	63,800

*All figures above refer to metric tons of fish.

Fish Specie: WITCH

AREA	1991	1992	QUOTA FOR 1993
A	2,000	5,000	
B	3,000	16,000	15,000
C	1,000	2,000	
D	10,000	15,000	8,000
E	4,000	10,000	6,500
F	2,000	3,000	2,900
G	7,000	6,000	
H	8,000	7,000	
I	4,000	2,000	
TOTALS	44,000	66,000	31,900

*All figures above refer to metric tons of fish.

Fish Specie: SILVER HAKE

AREA	1991	1992	QUOTA FOR 1993
A			
B			
C			
D			
E			
F			
G	225,000	425,000	425,000
H			
I			
TOTALS	225,000	425,000	425,000

*All figures above refer to metric tons of fish.

Fish Specie: MACKEREL

AREA	1991	1992	QUOTA FOR 1993
A			
B			
C			
D			
E			
F			
G	120,000	200,000	250,000
H	160,000	80,000	16,000
I		10,000	4,000
TOTALS	280,000	290,000	270,000

*All figures above refer to metric tons of fish.

Fish Specie: HADDOCK

AREA	1991	1992	QUOTA FOR 1993
A			
B			
C	2,000		
D	1,000		
E	2,000		
F	13,000		
G	14,000	20,000	17,000
H		9,000	5,000
I	15,000		
TOTALS	47,000	29,000	22,500

*All figures above refer to metric tons of fish.

Fish Specie: ROUNDNOSE GRENADIER

AREA	1991	1992	QUOTA FOR 1993
A		1,500	
B	1,000	3,000	1,000
C	5,000	10,000	5,000
D	7,000	5,000	3,000
E		6,000	8,000
F			
G			
H			
I			
TOTALS	13,000	25,500	17,000

*All figures above refer to metric tons of fish.

Fish Specie: HERRING

AREA	1991	1992	QUOTA FOR 1993
A			
B			
C			
D			
E			
F	300,000	50,000	30,000
G	140,000	100,000	80,000
H	300,000	20,000	20,000
I	100,000	60,000	40,000
TOTALS	840,000	230,000	170,000

*All figures above refer to metric tons of fish.

Fish Specie: CAPLIN

AREA	1991	1992	QUOTA FOR 1993
A		40,000	50,000
B		70,000	90,000
C			
D		30,000	33,500
E		40,000	58,000
F	2,000	40,000	50,000
G	13,000		
H	6,000		
I			
TOTALS	24,000	220,000	281,000

*All figures above refer to metric tons of fish.

Fish Specie: POLLOCK

AREA	1991	1992	QUOTA FOR 1993
A			
B			
C			
D			
E			
F	2,000	20,000	4,000
G	13,000	20,000	26,000
H	6,000		8,000
I			
TOTALS	21,000	40,000	38,000

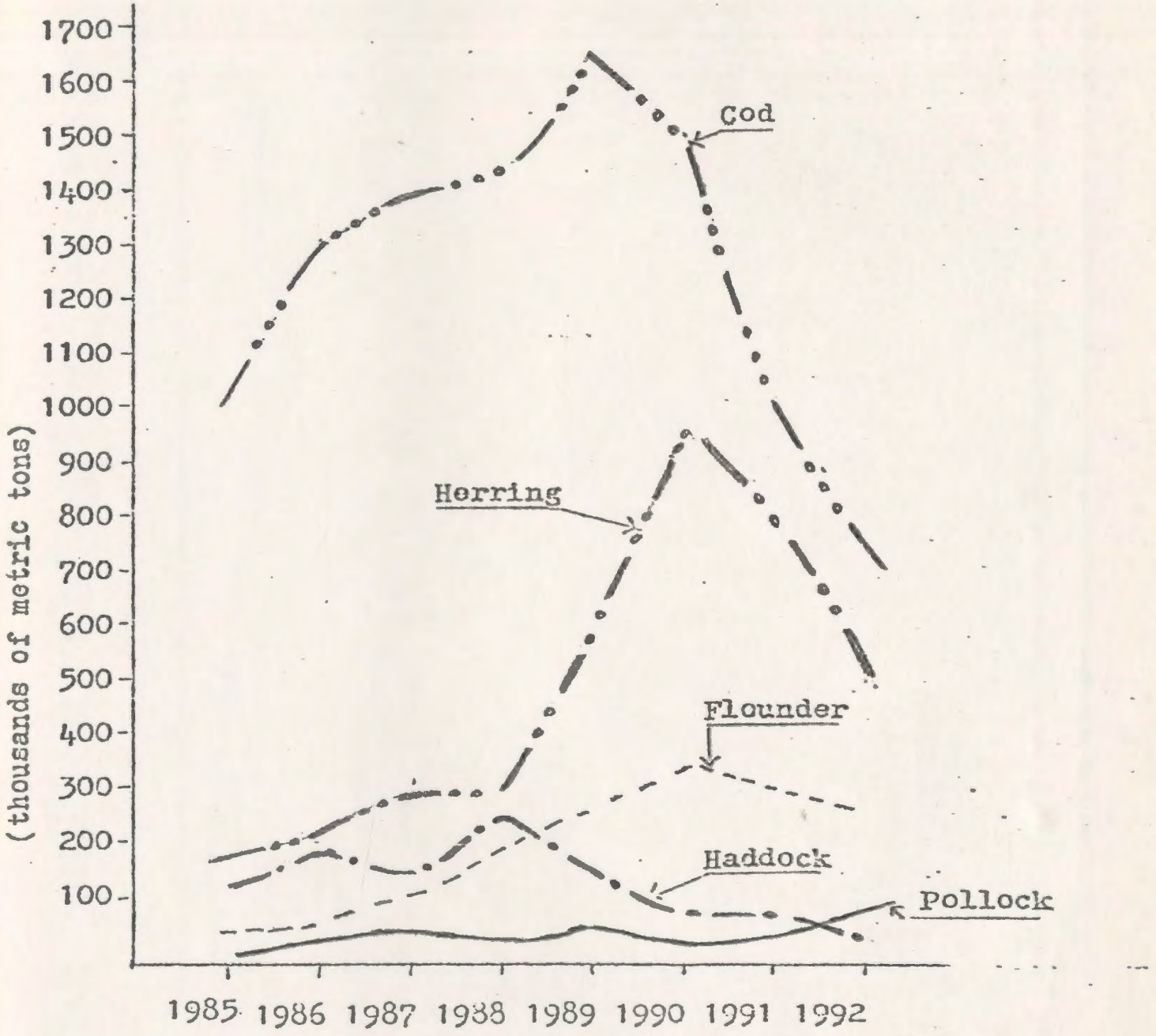
*All figures above refer to metric tons of fish.

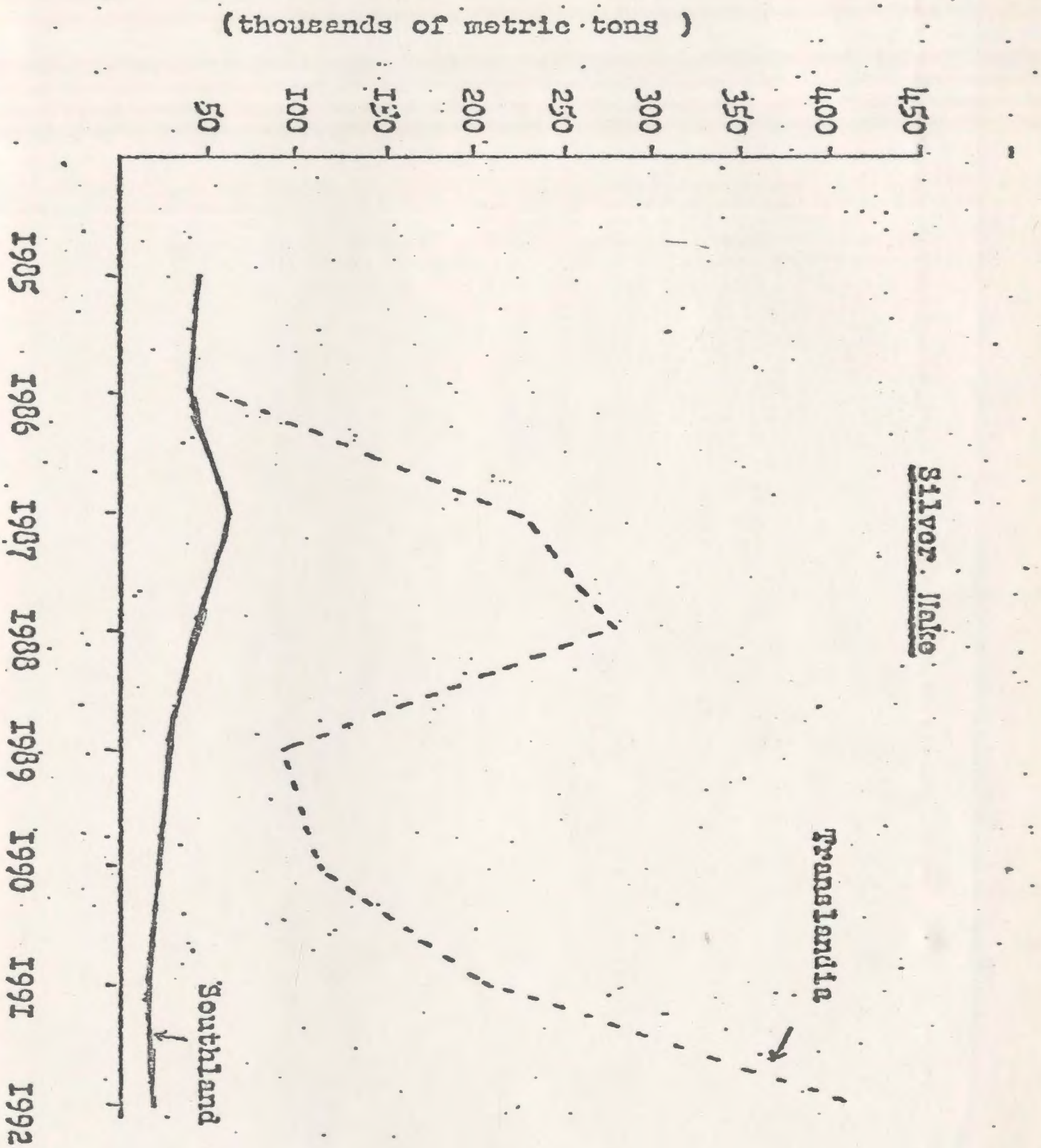
Fish Specie: ARGENTINE

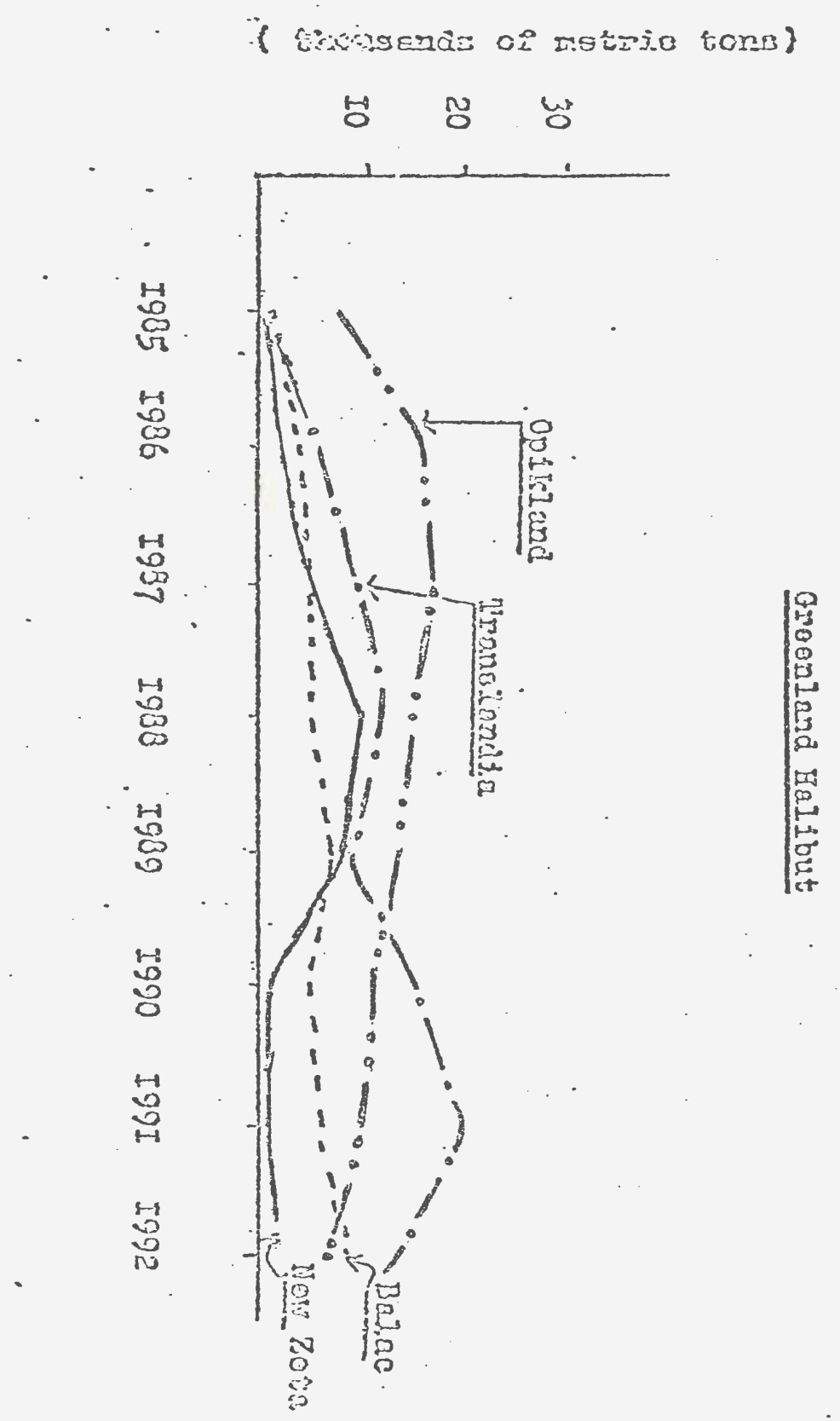
AREA	1991	1992	QUOTA FOR 1993
A			
B			
C	1,000		
D	5,000		
E	7,000		
F			1,000
G		2,000	1,500
H		2,500	2,500
I			
TOTALS	13,000	4,500	5,000

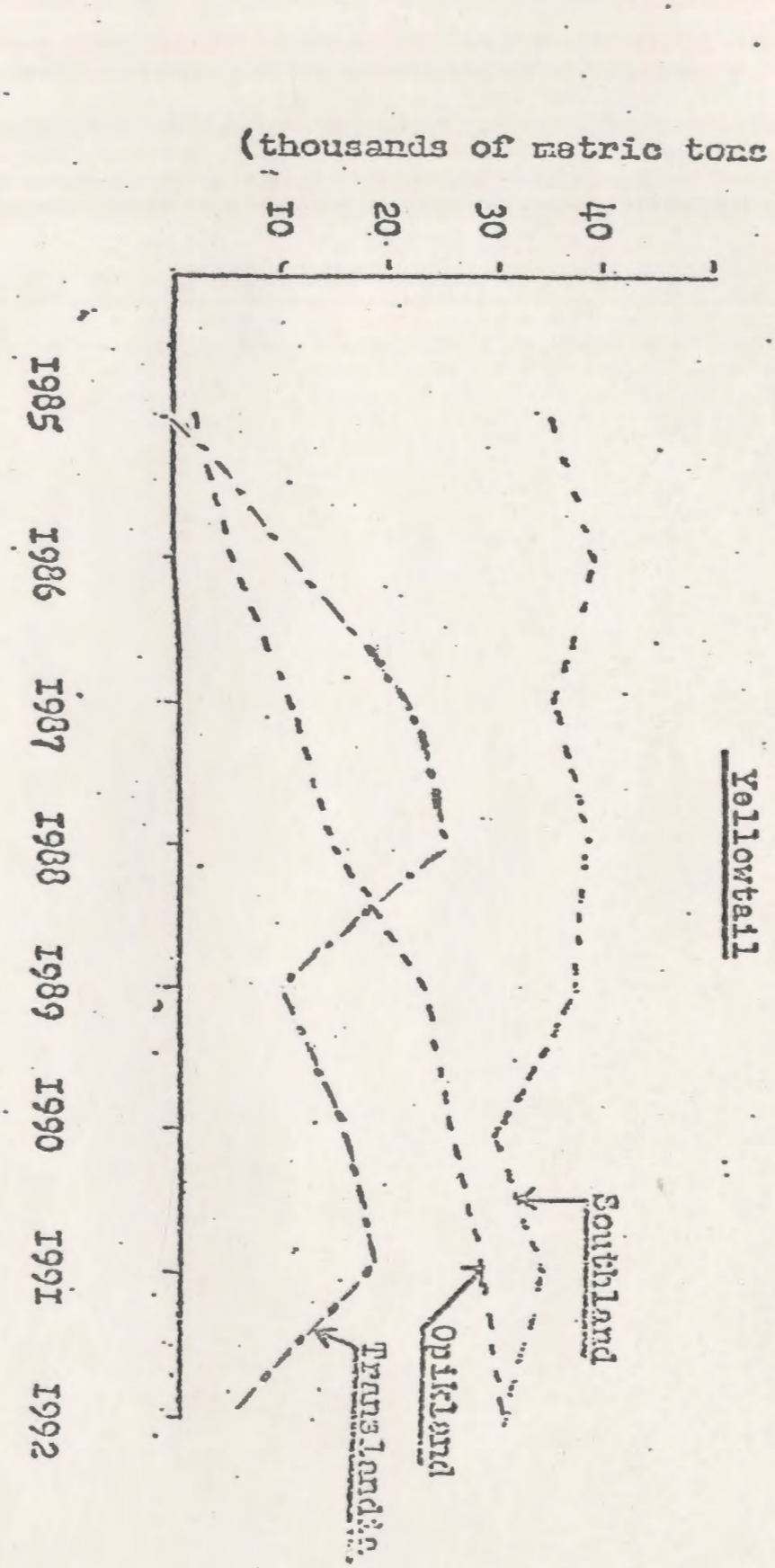
*All figures above refer to metric tons of fish.

Total catches of Cod, Haddock, Pollock, Flounder and Herring for all ISRC areas.




(thousands of metric tons)
50
100
150
200
250
300
350
400
450
1905
1906
1907
1908
1909
1910
1911
1912
Silver Lake
Translandia
Southland


(thousands of metric tons)
10
20
30
1985
1986
1987
1988
1989
1990
1991
1992
Greenland Halibut
Ottiland
Transatlantic
Balao
New Zoos


(thousands of metric tons
10
20
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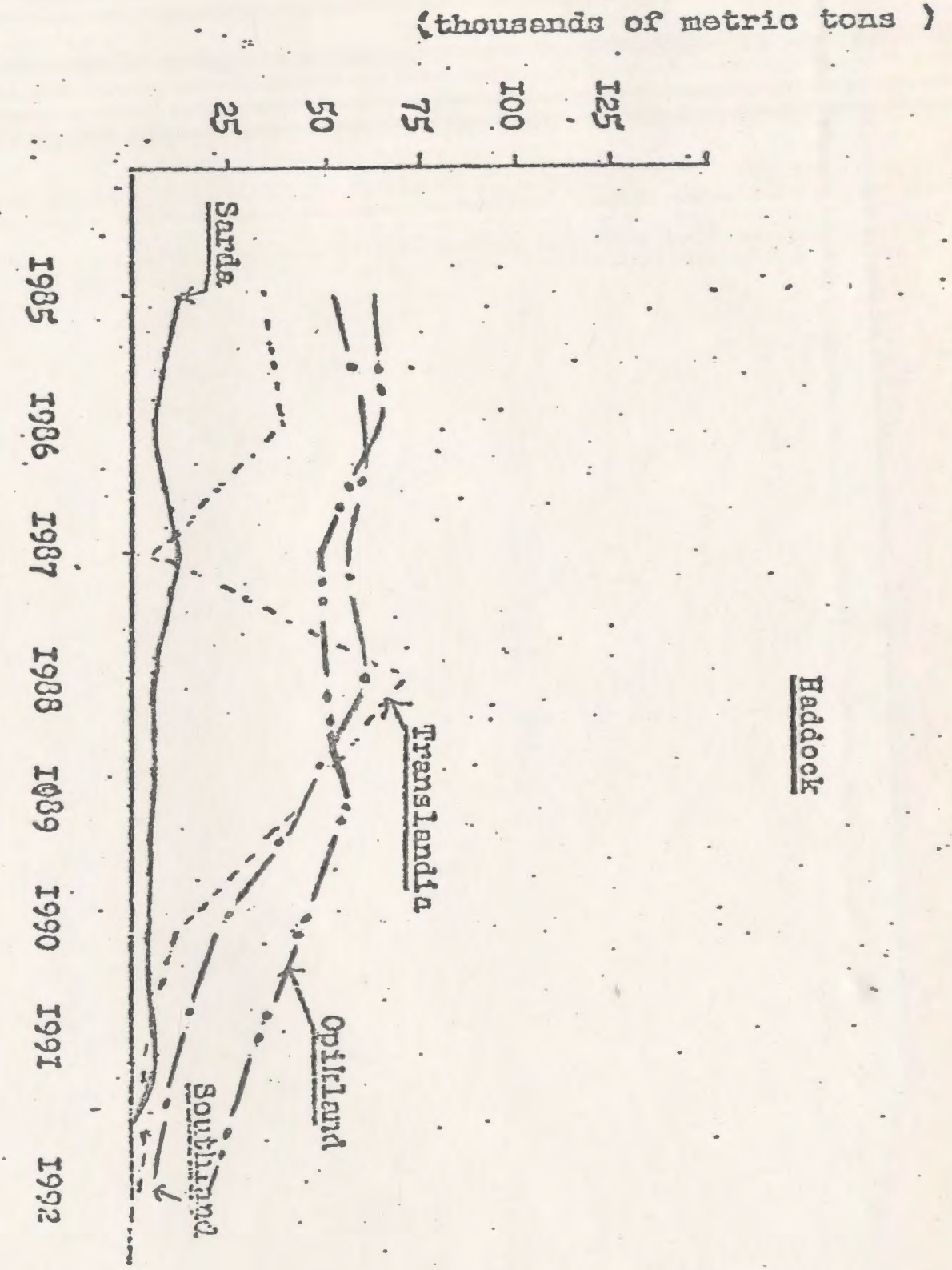
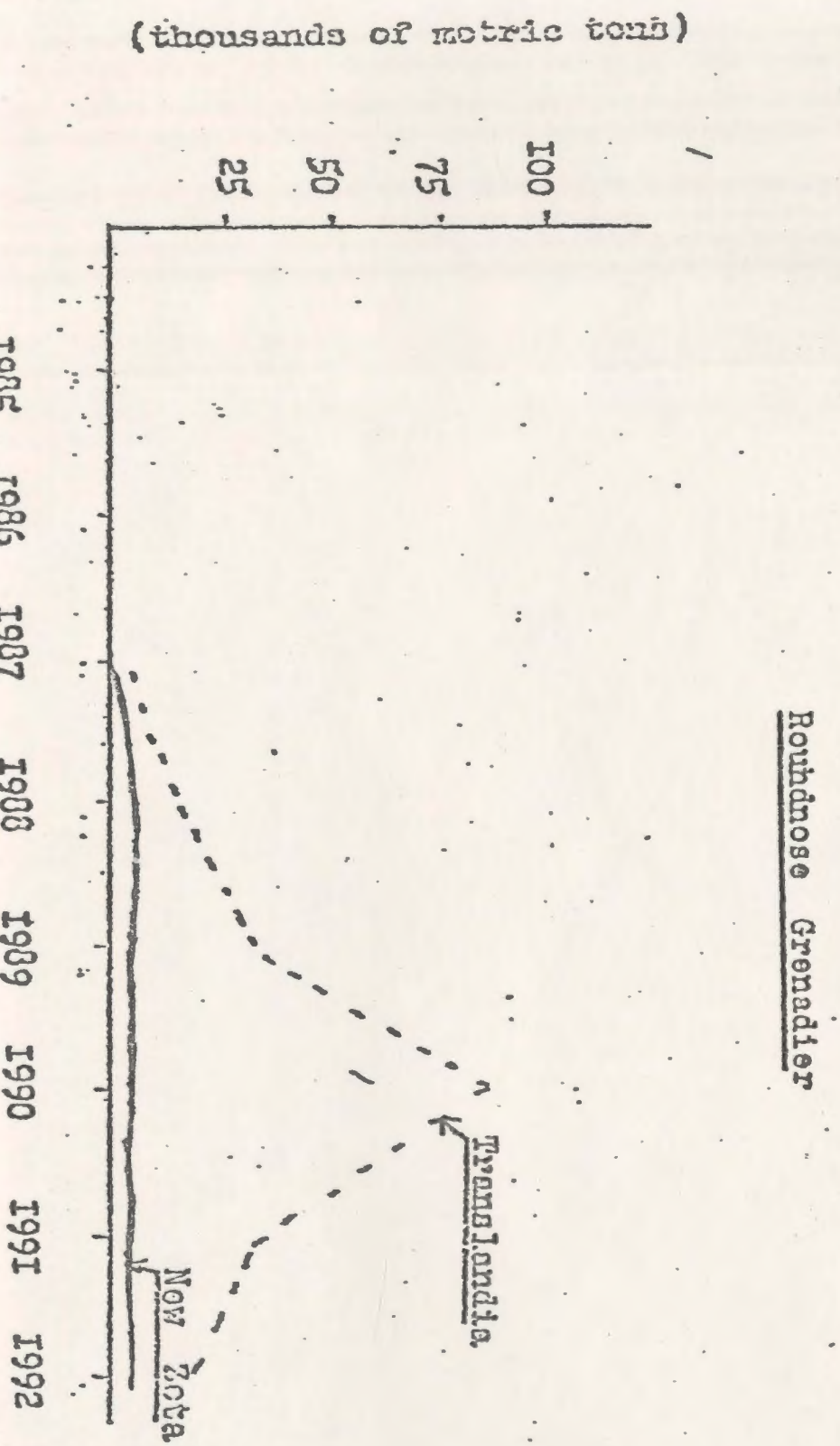
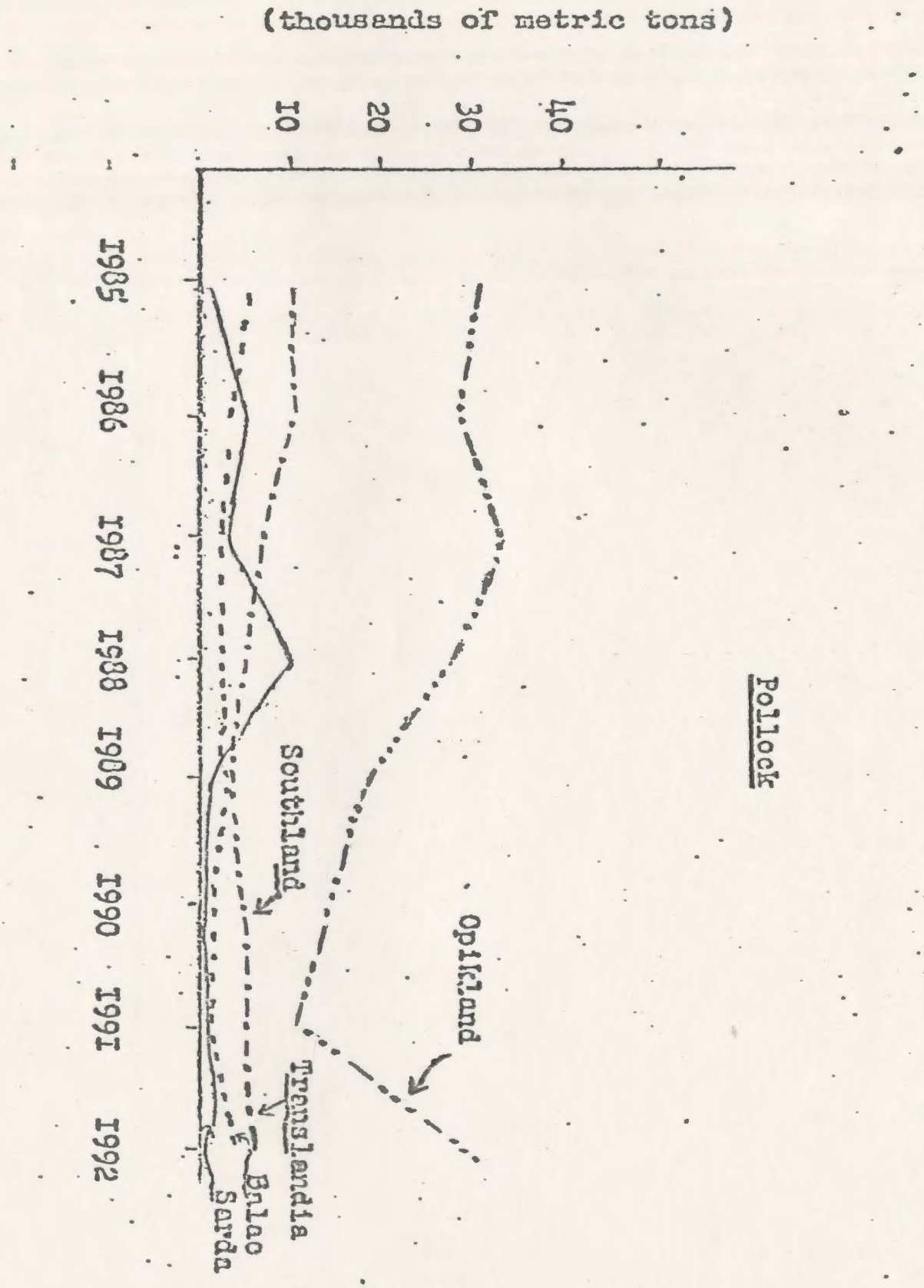
40
1985
1986
1987
1988
1989
1990
1991
1992
Yellowtail
Southland
Auckland
Translander


(thousands of metric tons)
25
50
75
100
125
1985
1986
1987
1988
1989
1990
1991
1992
Sarda
Translandia
Optiland
Southland
Haddock


(thousands of metric tons)
25
50
75
100
1985
1986
1987
1988
1989
1990
1991
1992
Roughnose Grenadier
Greenland Halibut
Cod 2GHa


(thousands of metric tons)
10
20
30
40
1985
1986
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1988
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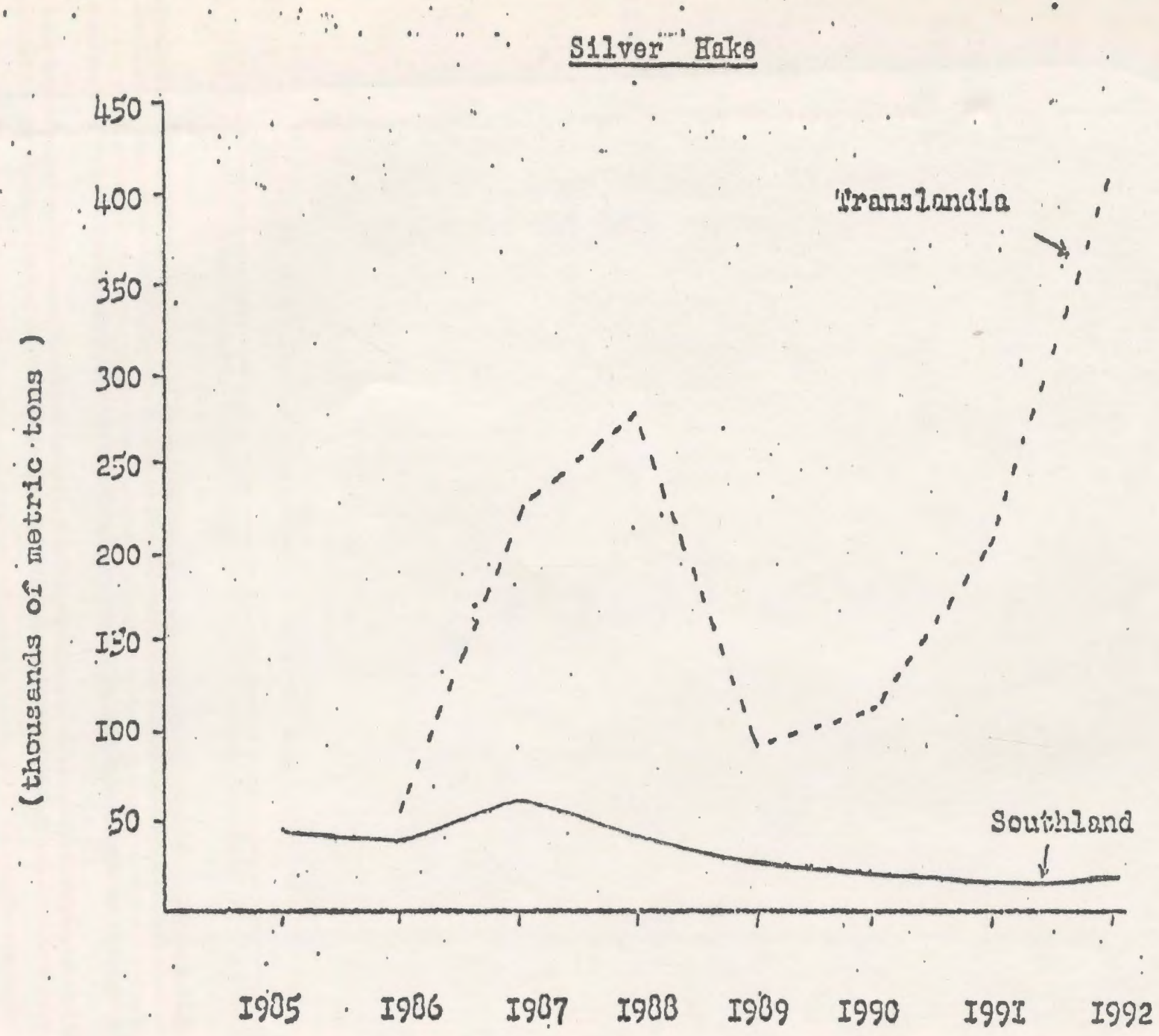
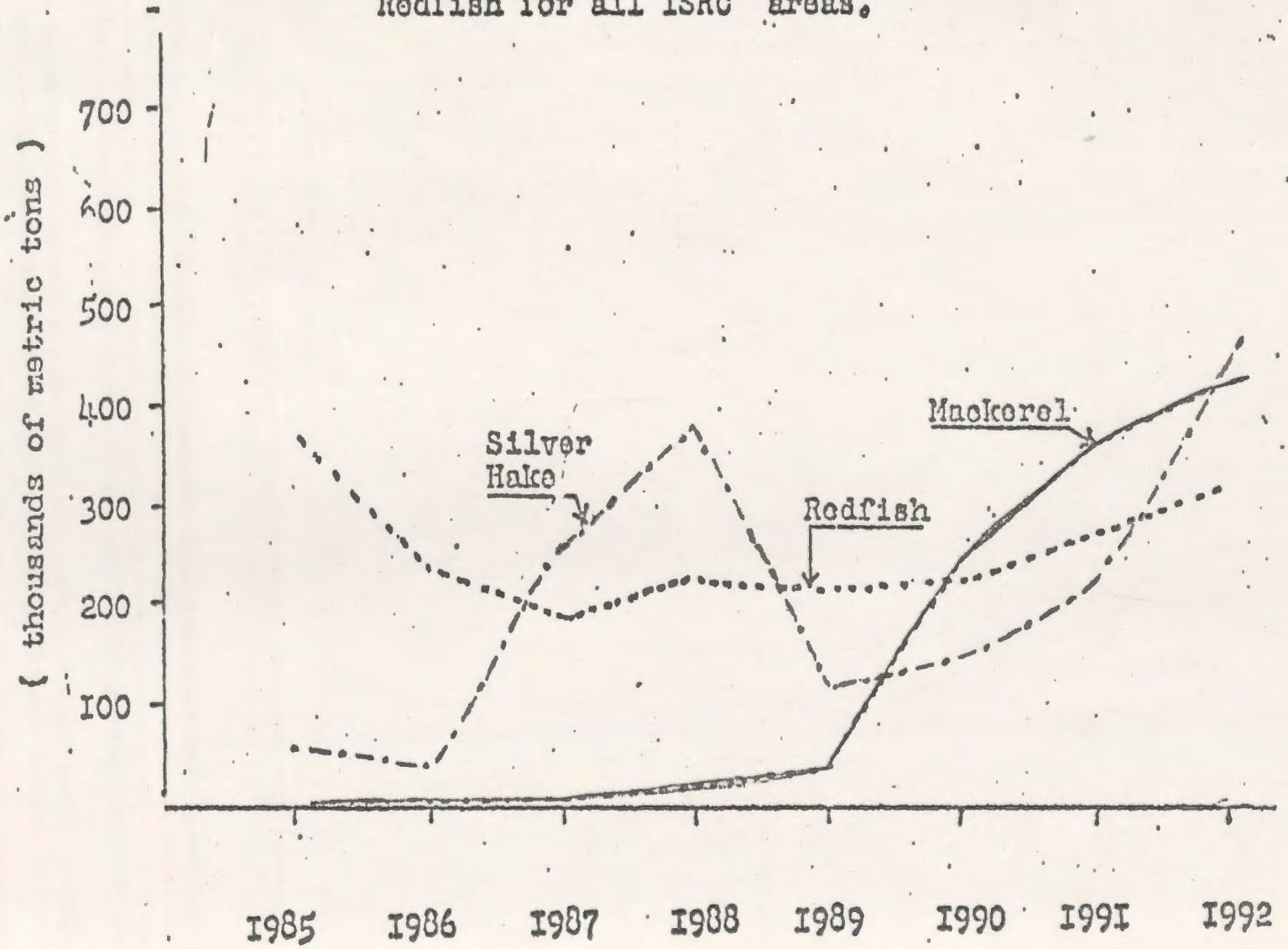
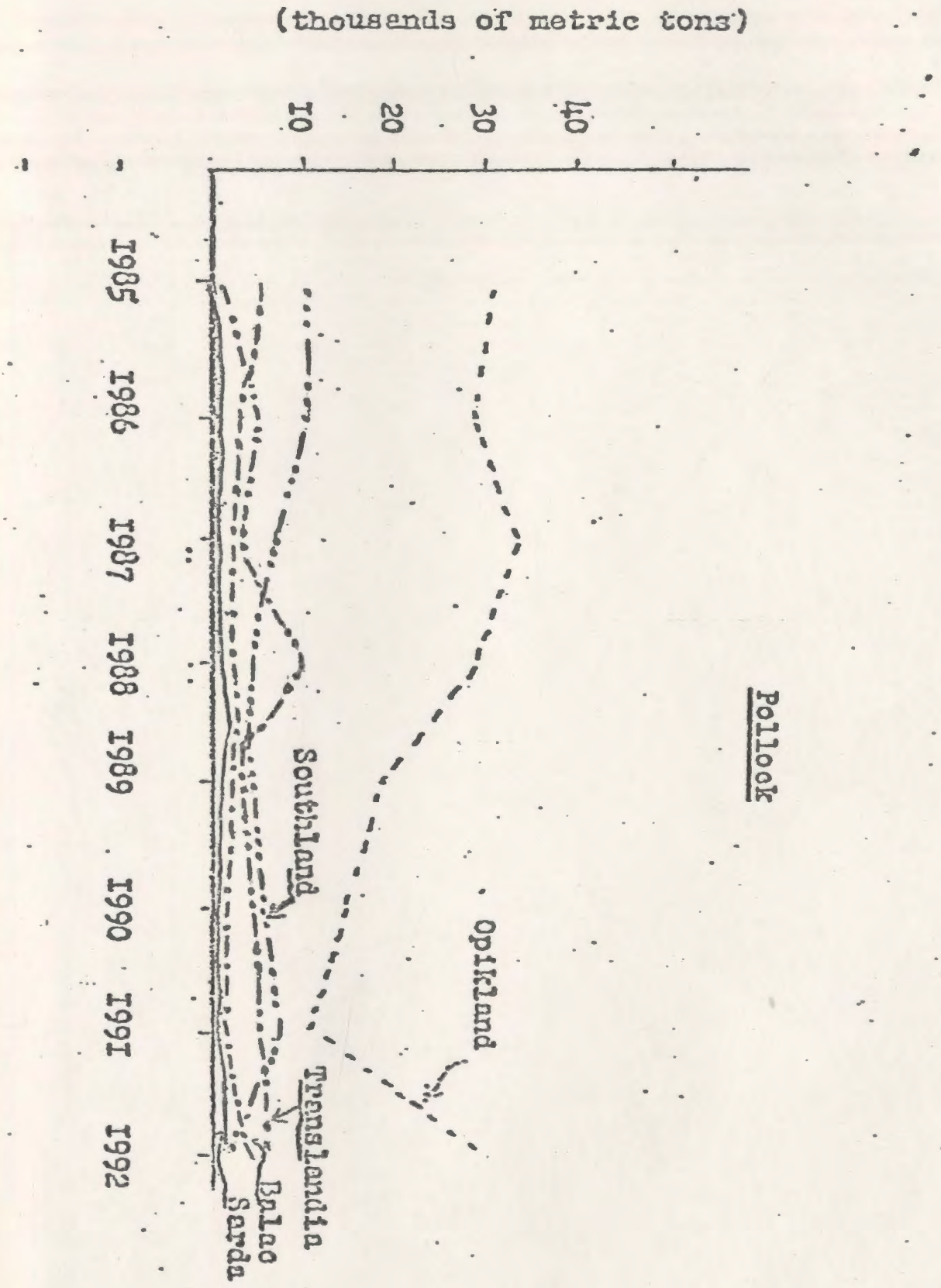
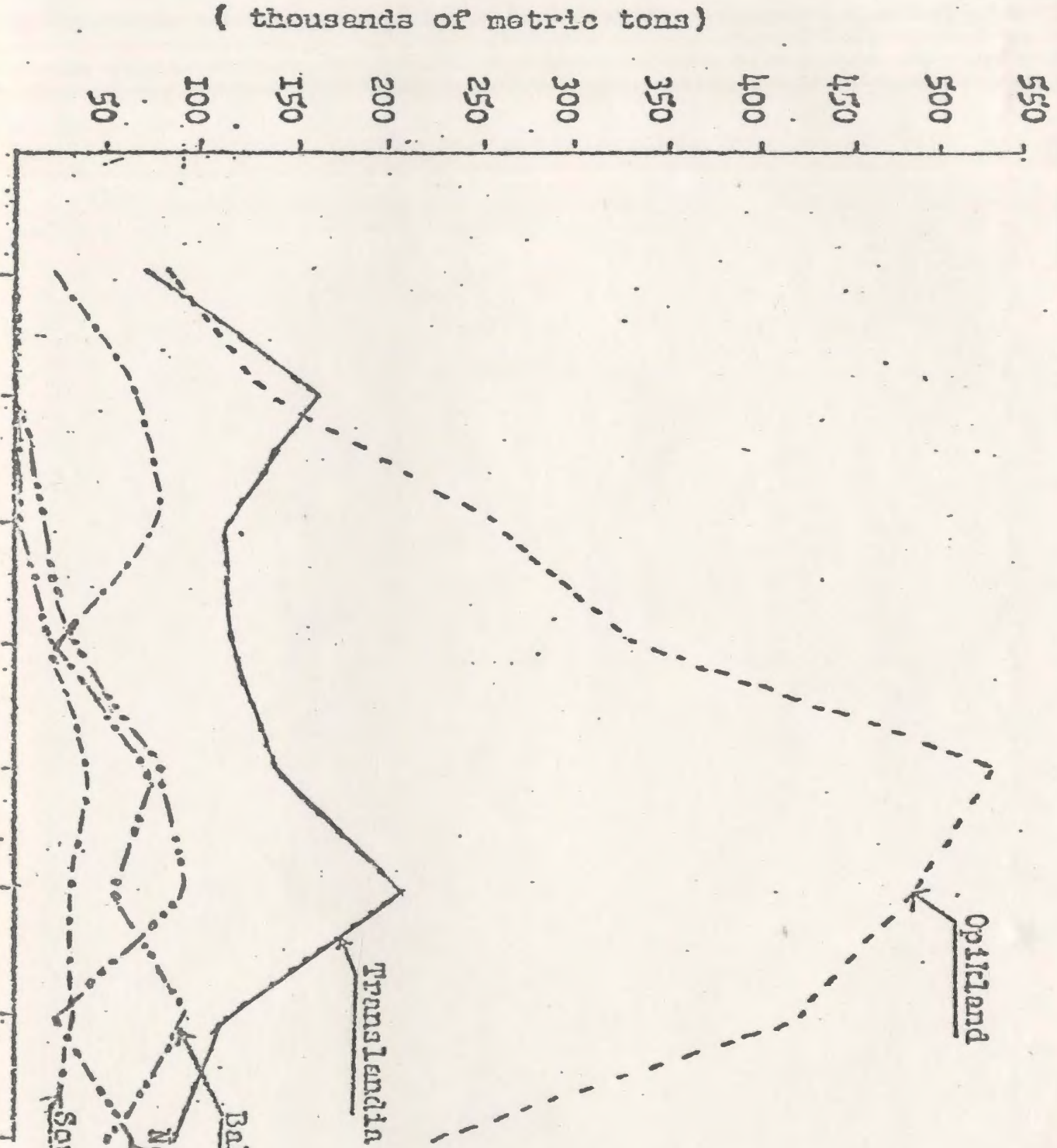
Pollock
Southland
Optiland
Transalandia
Bulao
Sarda

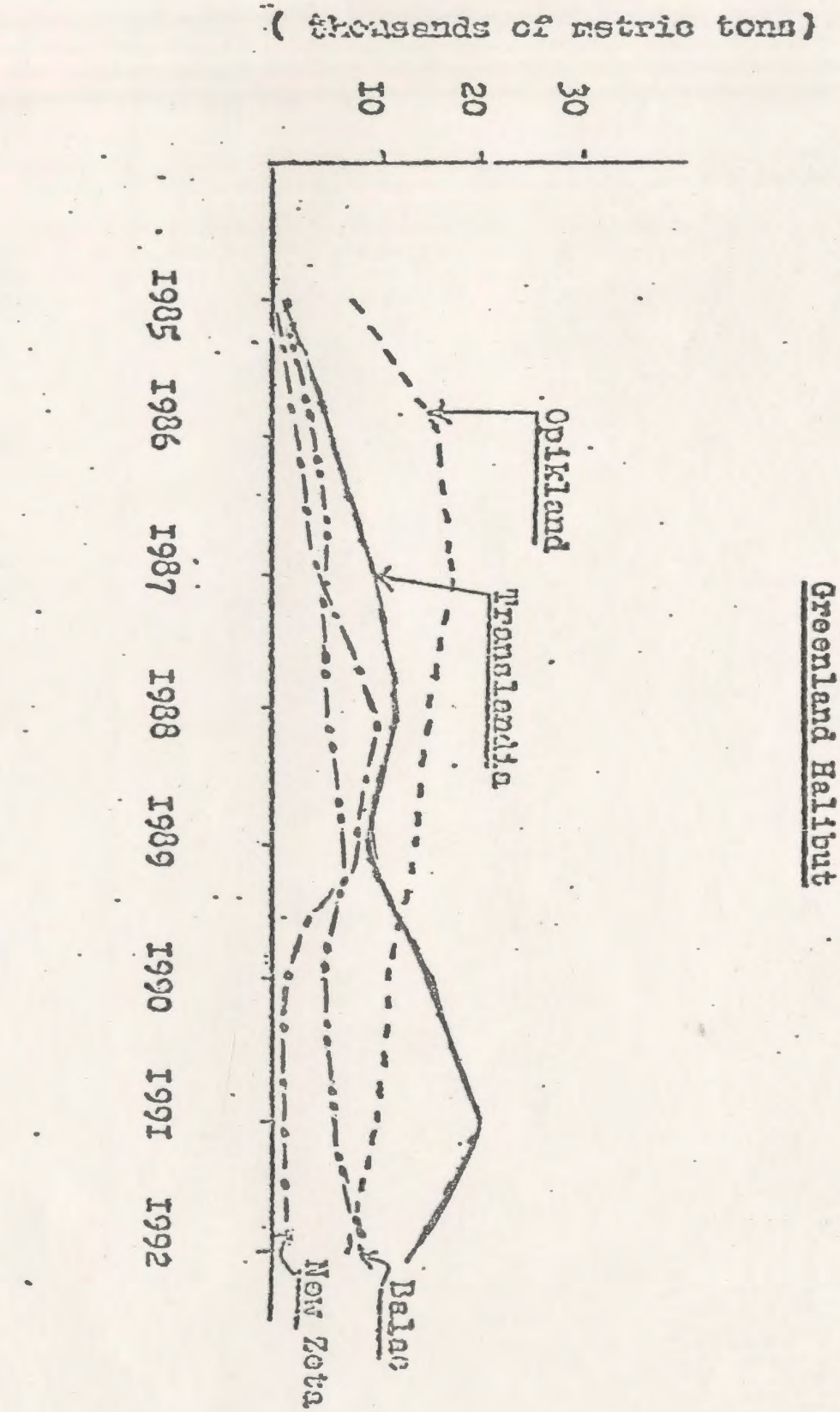

Silver Hake
450
400
350
300
250
200
150
100
50
(thousands of metric tons)
Translandia
Southland
1985
1986
1987
1988
1989
1990
1991
1992

Total catches of Mackerel, Silver Hake and Redfish for all ISRC areas.



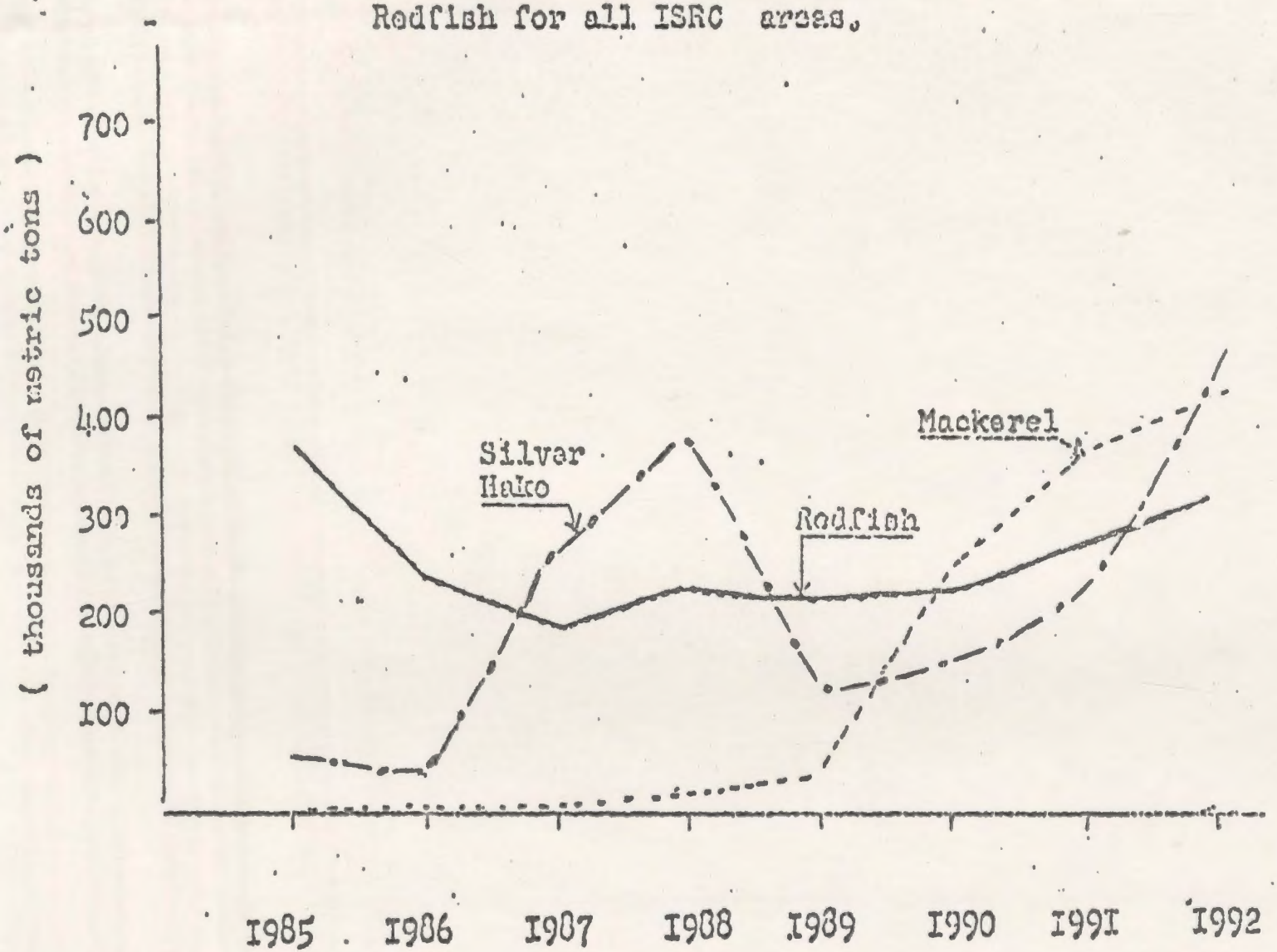

(thousands of metric tons)
10
20
30
40
1985
1986
1987
1988
1989
1990
1991
1992
Pollock
Southland
Opiktland
Translandia
Balao
Sarda

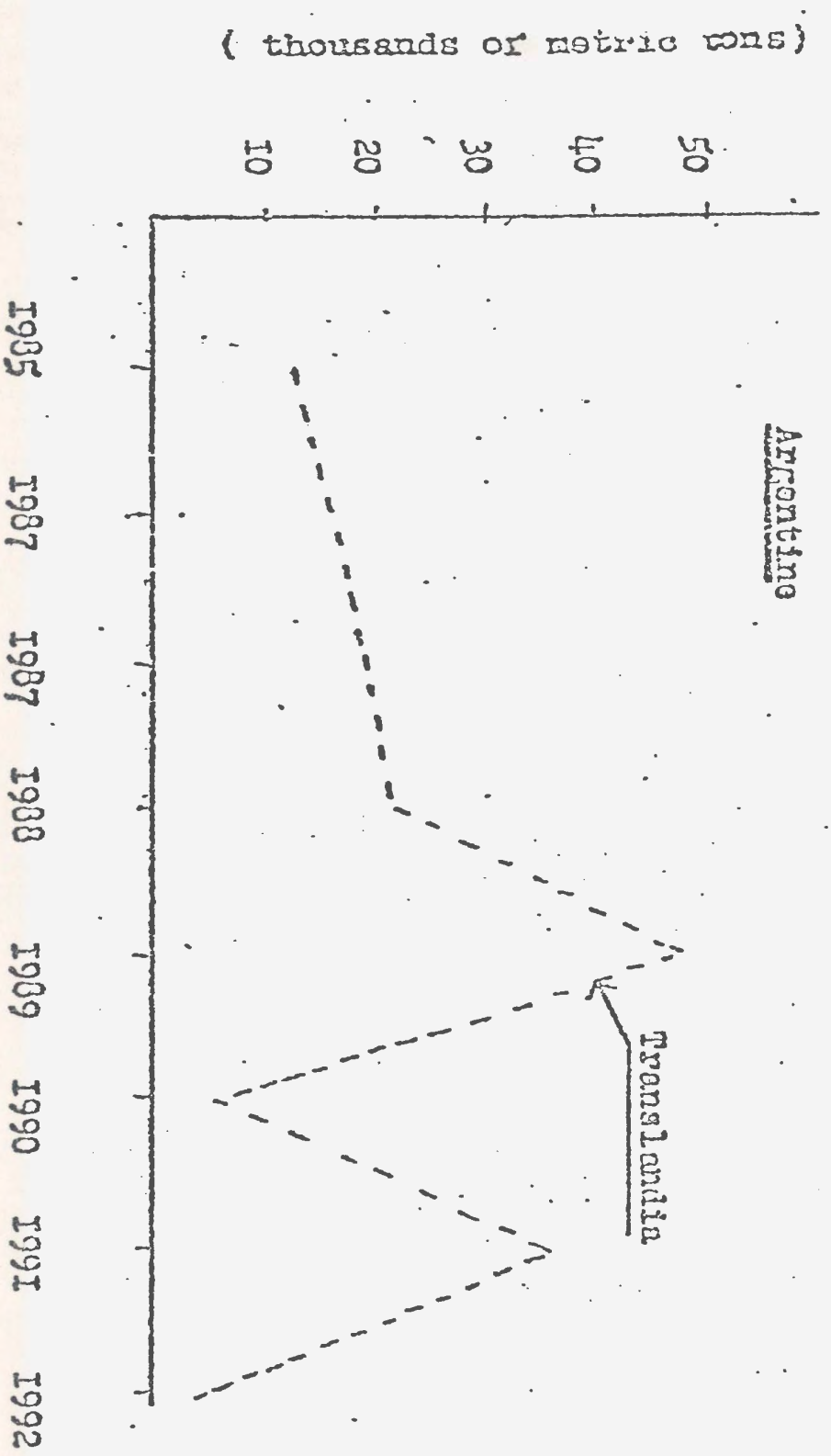

(thousands of metric tons)
50
100
150
200
250
300
350
400
450
500
550
Herring
Optiland
Translandia
Balac
New Zova
Southland

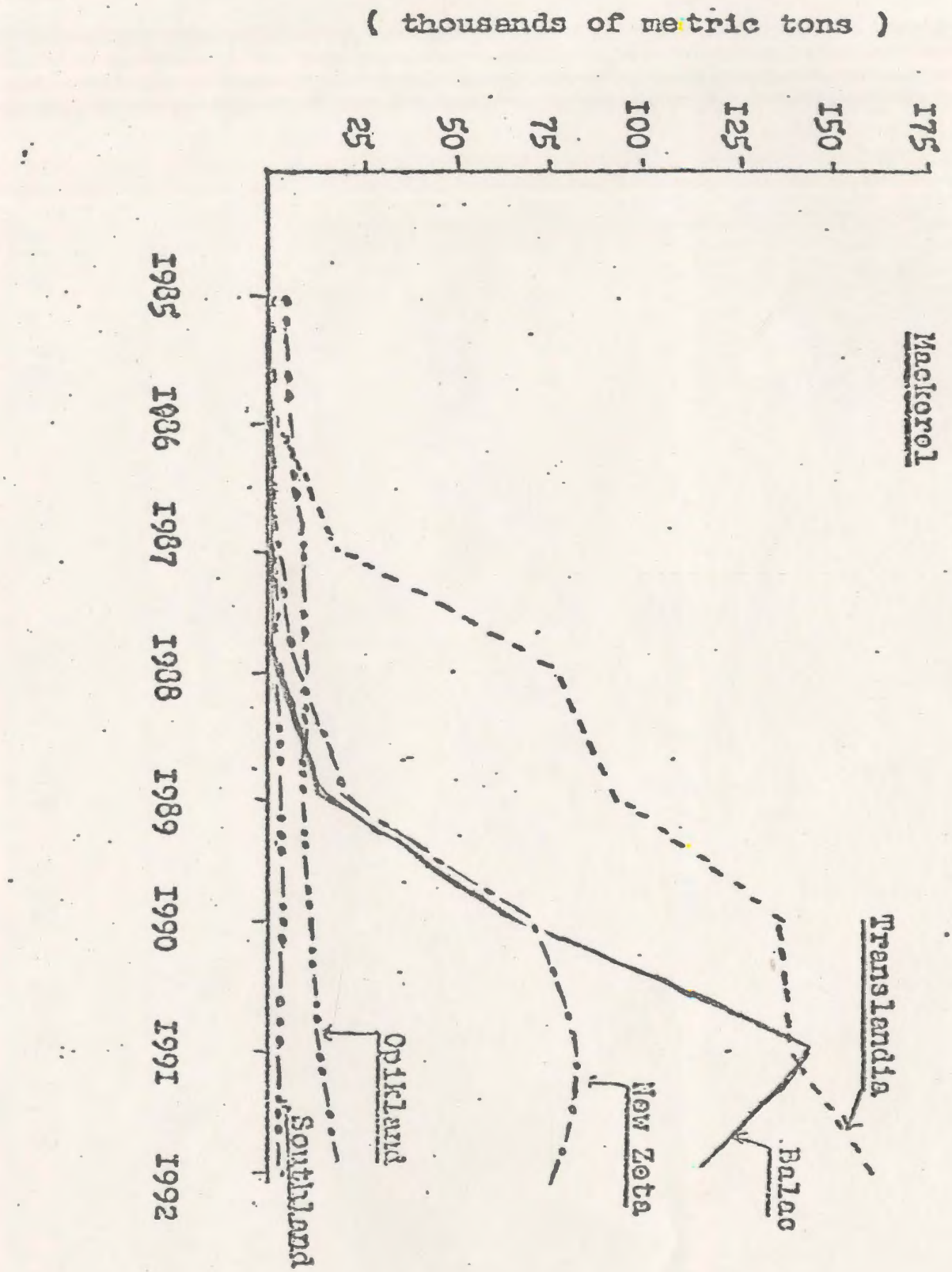


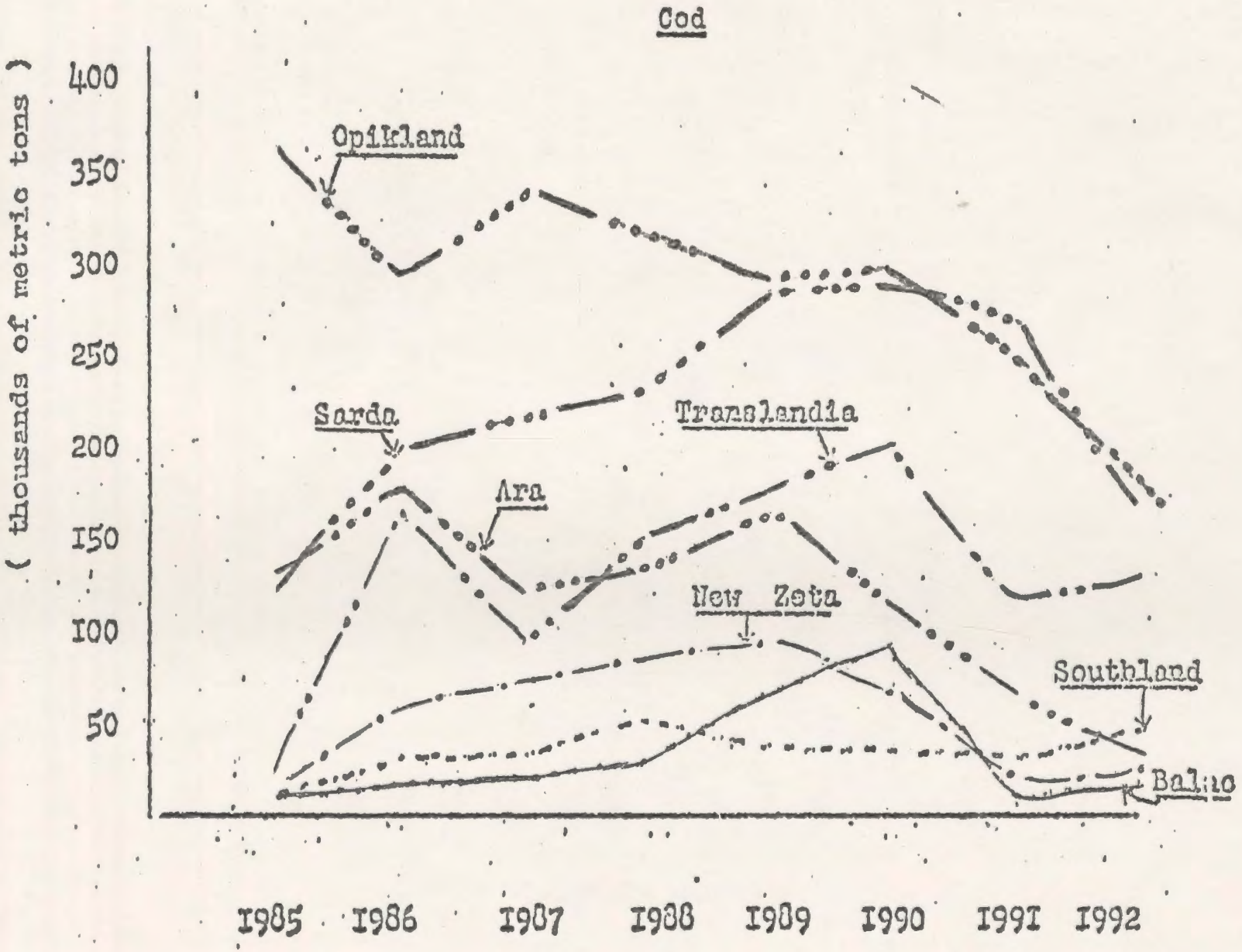
Greenland Halibut

Total catches of Mackerel, Silver Hake and Redfish for all ISRC areas.

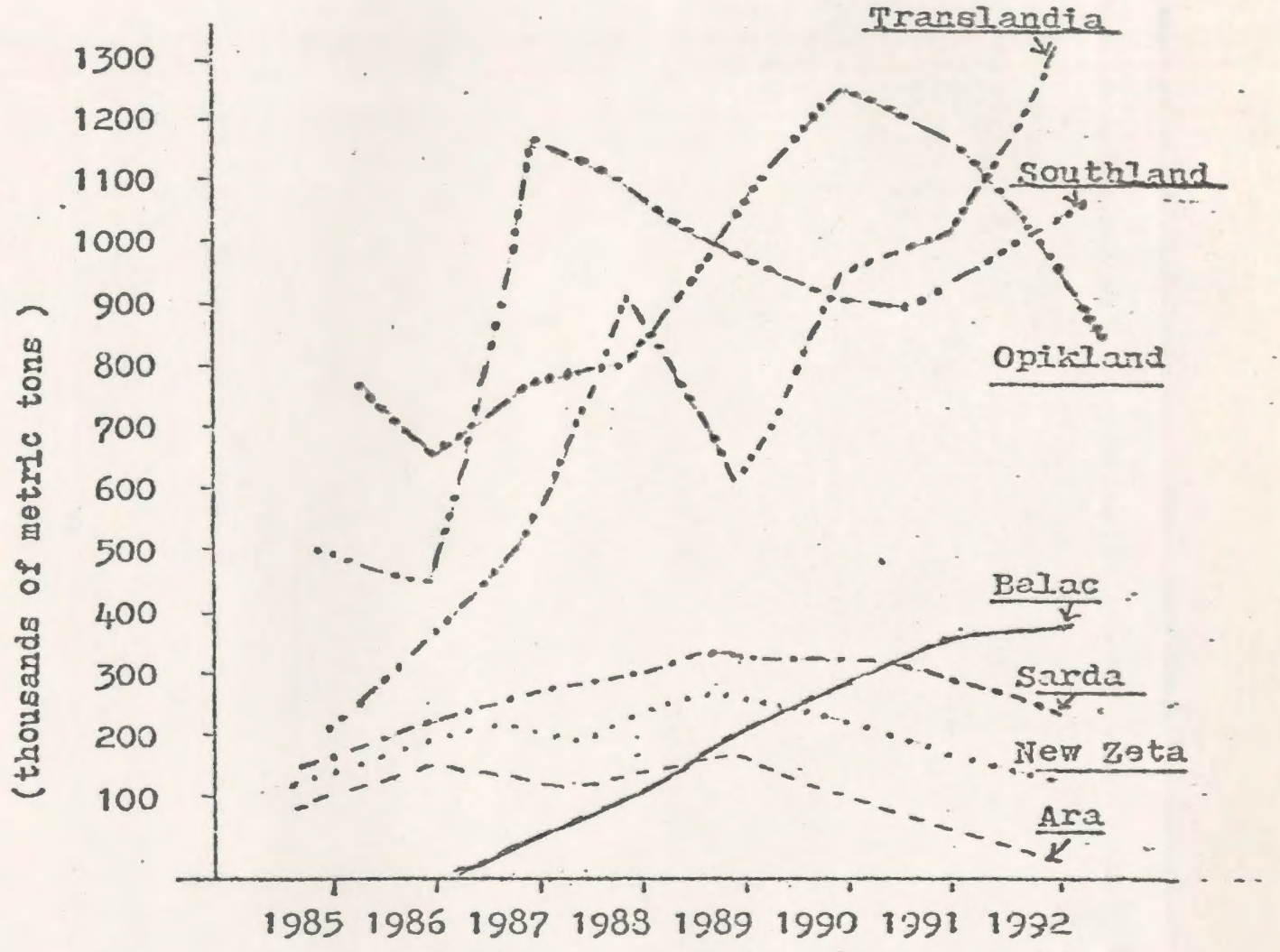


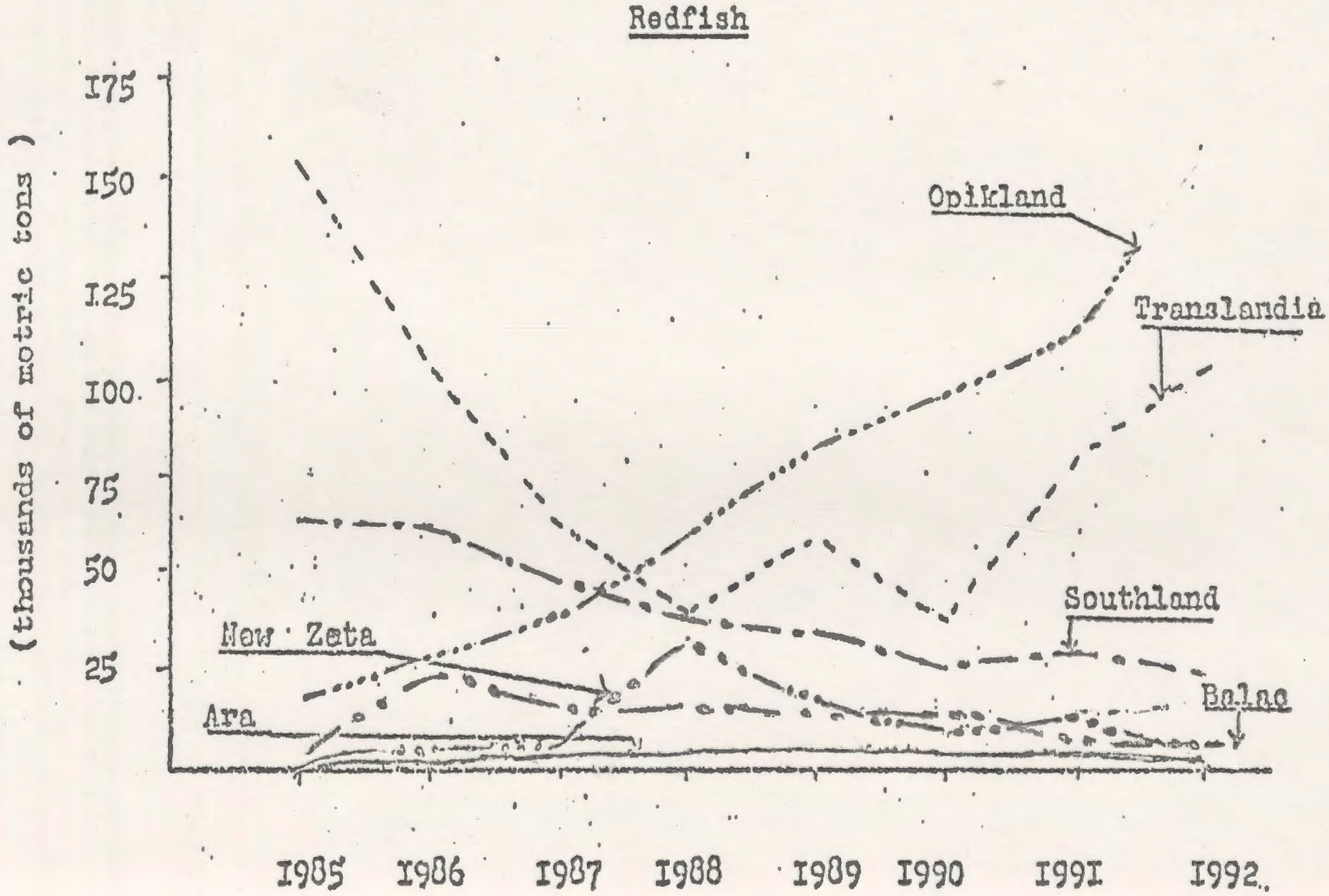

(thousands of metric tons)
10
20
30
40
50
1985
1987
1987
1988
1989
1990
1991
1992
Argentine
Translandia

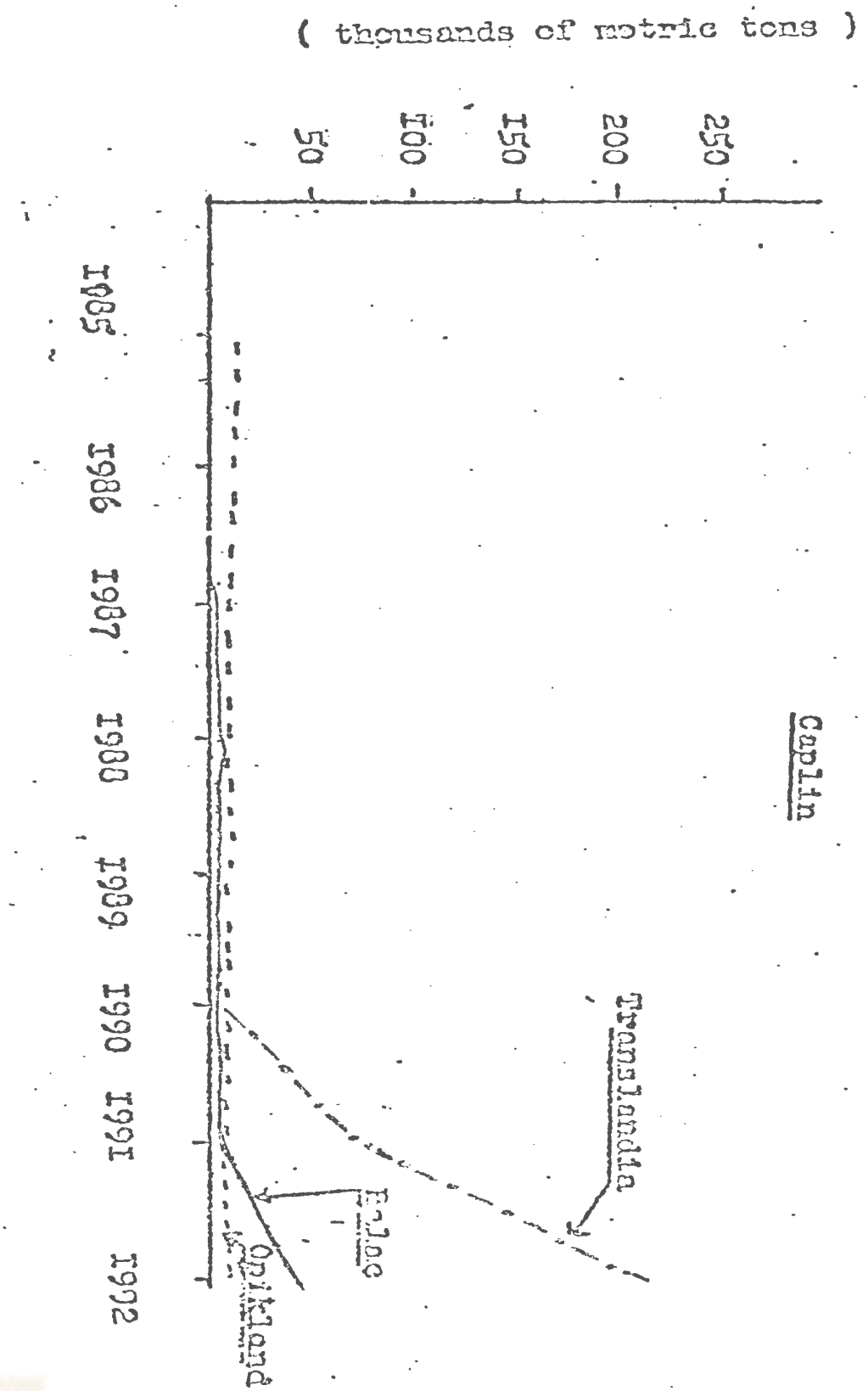

(thousands of metric tons)
25
50
75
100
125
150
175
1985
1986
1987
1988
1989
1990
1991
1992
Mackerel
Translandia
Balao
New Zeta
Optiland
Southland


Cod
(thousands of metric tons)
400
350
300
250
200
150
100
50
Opikland
Sarda
Translandia
Ara
New Zeta
Southland
Balmo
1985
1986
1987
1988
1989
1990
1991
1992

Catches of all species of fish by ISRC countries (1985 - 1992).




Redfish
(thousands of metric tons)
175
150
125
100
75
50
25
Opikland
Translandia
Southland
New Zeta
Ara
Balao
1985
1986
1987
1988
1989
1990
1991
1992


(thousands of metric tons)
50
100
150
200
250
1985
1986
1987
1988
1989
1990
1991
1992
Capelin
Translandia
Eglao
Opilland

DEFINITION OF TERMS

Abstention principle. In the case where a country has developed a fishery in a given area, the doctrine that other states that have formerly not fished that stock or have not contributed to the development of the area should abstain from fishing there in the future.

Archipelago state. A nation comprised wholly of islands.

Baseline. The reference line from which the outer limits of territorial waters and other offshore zones are measured; the dividing line between inland waters and territorial waters. Straight baselines are straight lines drawn along a coast to define inland waters when following low-water sinuosities is not appropriate. They connect the outermost points of islands and coastal headlands if a coast is deeply fiorded or bordered by a fringe of islands and if enclosed waters have historically had great economic importance to adjacent communities.

Closing lines. The straight lines that separate internal waters in the form of river mouths, harbours, legal bays, and historic waters from territorial waters.

Coastal state. A nation that borders on the ocean.

Contiguous zones. Zones seaward of territorial waters over which some nations assert certain types of jurisdiction and control without affecting the character of the area as high seas.

Continental shelf. The submerged portion of a continent that slopes gently seaward and extends from the low-water line to a point where it plunges towards the great ocean depths at a substantially steeper angle. The steep declivity beginning at the outer edge of the continental shelf and descending towards the great ocean depths is called the continental slope. It often terminates at the continental rise, a less steeply inclined area linking the continental slope to the abyssal plain. The seaward limit of the continental rise is known as the continental margin.

Economic zone. A wide area beyond the twelve-mile limit within which a coastal state would exercise national jurisdiction over offshore resources.

Free transit (right of). The proposed right of foreign vessels to navigate international straits free of any coastal state interference.

High seas. The ocean beyond territorial waters, which is not subject to the exclusive jurisdiction of any one nation.

Innocent passage (doctrine of). The right of ships to navigate through territorial waters to inland waters or to the high seas provided the security, good order, and peace of the coastal state are not prejudiced. Such navigation includes the right of ships to stop or anchor, if necessary, as part of normal operations or because of an accident.

Internal (or inland) waters. The freshwater bodies within a nation's territory and that part of the ocean located on the landward side of the baseline from which territorial waters are measured. These waters include the tidal area between the high and low-water marks and legal bays, harbours, river mouths, and historic waters separated from territorial waters by closing lines.

Maximum economic yield. The highest level of total output that can be obtained from a renewable resource by minimizing unit costs, subject to the condition that the resource supply is preserved on a perpetual basis.

Maximum sustainable yield. The highest level of total output that can be obtained from a renewable resource, irrespective of total costs incurred but taking into account the need to preserve the resource supply on a perpetual basis. (The maximum sustainable yield is usually greater than, and never less than, the maximum economic yield.)

Median line. A method of defining a boundary through territorial waters between two coastal states. All points of a median line boundary are equidistant from the baselines of the adjacent or opposite states that are separated by the boundary.

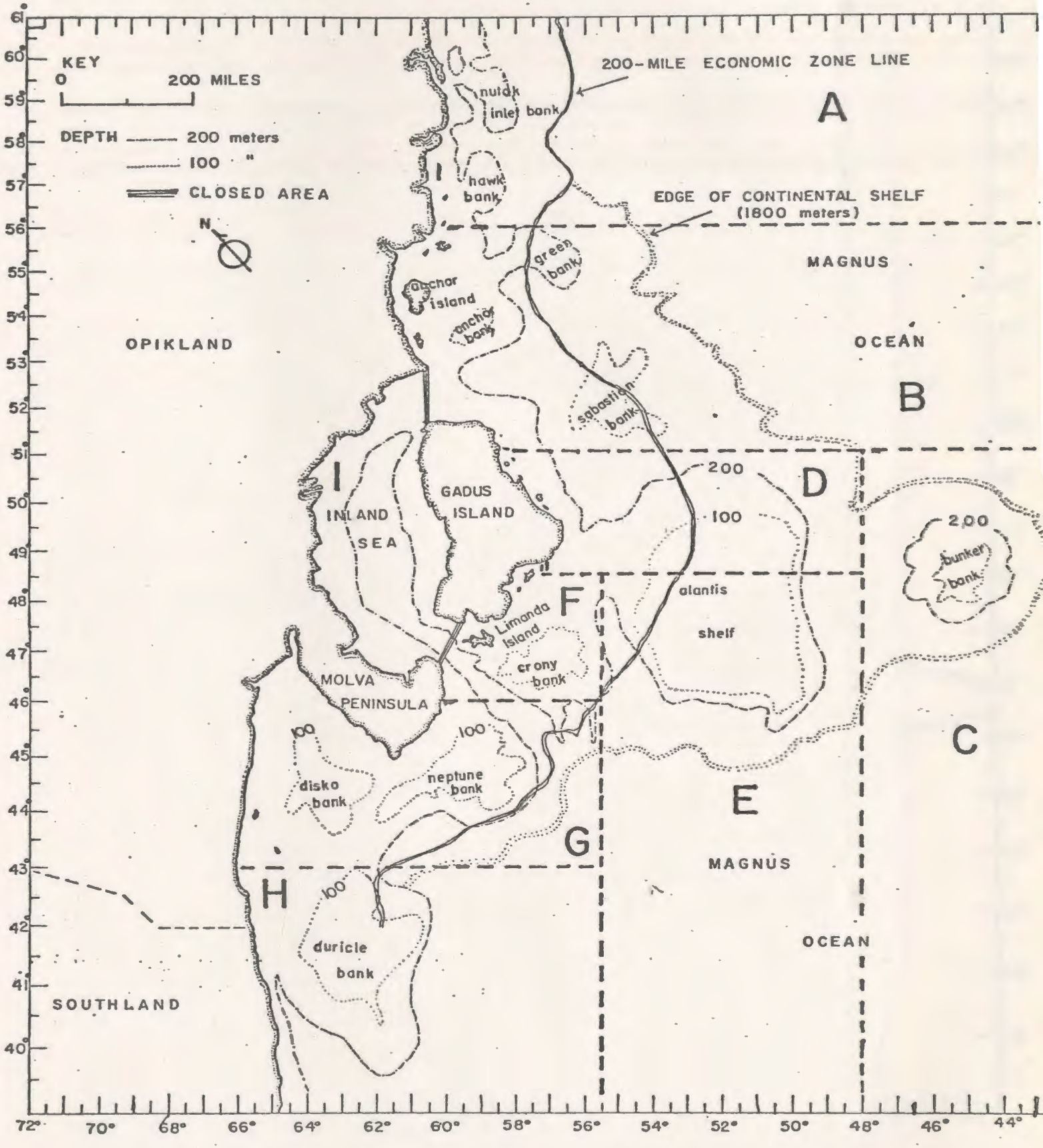
Straits state. A nation that borders one or both sides of a strait used for international navigation.

Territorial waters (or seas). The water area bordering a nation over which it has sovereignty except for the right of innocent passage of foreign vessels. It extends seaward from the outer limit of internal waters, but there is as yet no international agreement about its width.

Zone-locked state. A nation that would lack direct access to the high seas except through the economic zones of one or more foreign nations.

The above definitions were taken from Logan, 1974 (p. 104).

MAGNUS OCEAN COUNTRIES



MAGNUS OCEAN COUNTRIES

APPENDIX G

Tables of questions which yielded significant results

TABLE VI

RESPONSE OF GRADE NINE STUDENTS BY SEX

Question 4

	Male	Female	Total
Positive	9	10	19
Negative	9	2	11
TOTAL	18	12	30

$$X^2 = \frac{N(ad - bc - \frac{n}{2})^2}{(a + b)(c + d)(a + c)(b + d)}$$

$$X^2 = 5.02$$

TABLE VII

RESPONSE OF GRADE NINE STUDENTS BY SEX

Question 5

	Male	Female	Total
Positive	6	9	15
Negative	12	3	15
TOTAL	18	12	30

$$X^2 = \frac{N(ad - bc - \frac{n}{2})^2}{(a + b)(c + d)(a + c)(b + d)}$$

$$X^2 = 6.805$$

TABLE VIII

RESPONSE OF GRADE NINE STUDENTS BY SEX

Question 6

	Male	Female	Total
Positive	7	10	17
Negative	11	2	13
TOTAL	18	12	30

$$X^2 = \frac{N(ad - bc - \frac{n}{2})^2}{(a + b)(c + d)(a + c)(b + d)}$$

$$X^2 = 7.47$$

TABLE IX

RESPONSE OF GRADE NINE STUDENTS BY SEX

Question 10

	Male	Female	Total
Positive	9	11	20
Negative	9	1	10
TOTAL	18	12	30

$$X^2 = \frac{N(ad - bc - \frac{n}{2})^2}{(a + b)(c + d)(a + c)(b + d)}$$

$$X^2 = 7.656$$

TABLE X

RESPONSE OF GRADE NINE STUDENTS BY IQ

Question 1

	110+	109-	Total
Positive	1	5	6
Negative	13	11	24
TOTAL	14	16	30

$$X^2 = \frac{N(ad - bc - \frac{n}{2})^2}{(a + b)(c + d)(a + c)(b + d)}$$

$$X^2 = 4.428$$

TABLE XI

RESPONSE OF GRADE TEN STUDENTS BY SEX

Question 14

	Male	Female	Total
Positive	0	4	4
Negative	5	3	8
TOTAL	5	7	12

$$P = \frac{(A + B)!\ (C + D)!\ (A + C)!\ (B + D)!}{N!\ A!\ B!\ C!\ D!}$$

$$P = \frac{5!\ 7!\ 4!\ 8!}{12!\ 0!\ 5!\ 4!\ 3!}$$

$$P = 0.012$$

TABLE XII

RESPONSE OF GRADE TEN STUDENTS BY SEX

Question 9

	110+	109-	Total
Positive	4	5	9
Negative	2	1	3
TOTAL	6	6	12

$$P = \frac{(A + B)!\ (C + D)!\ (A + C)!\ (B + D)!}{N!\ A!\ B!\ C!\ D!}$$

$$P = \frac{(9!)\ 3!\ 6!\ 6!}{12!\ 4!\ 5!\ 2!\ 1!}$$

$$P = 0.045$$

TABLE XIII

RESPONSE OF GRADE NINE AND TEN STUDENTS

Question 5

	Grade 9	Grade 10	Total
Positive	7	6	13
Negative	23	6	29
TOTAL	30	12	42

$$X^2 = \frac{N(ad - bc - \frac{n}{2})^2}{(a + b)(c + d)(a + c)(b + d)}$$

$$X^2 = 4.236$$